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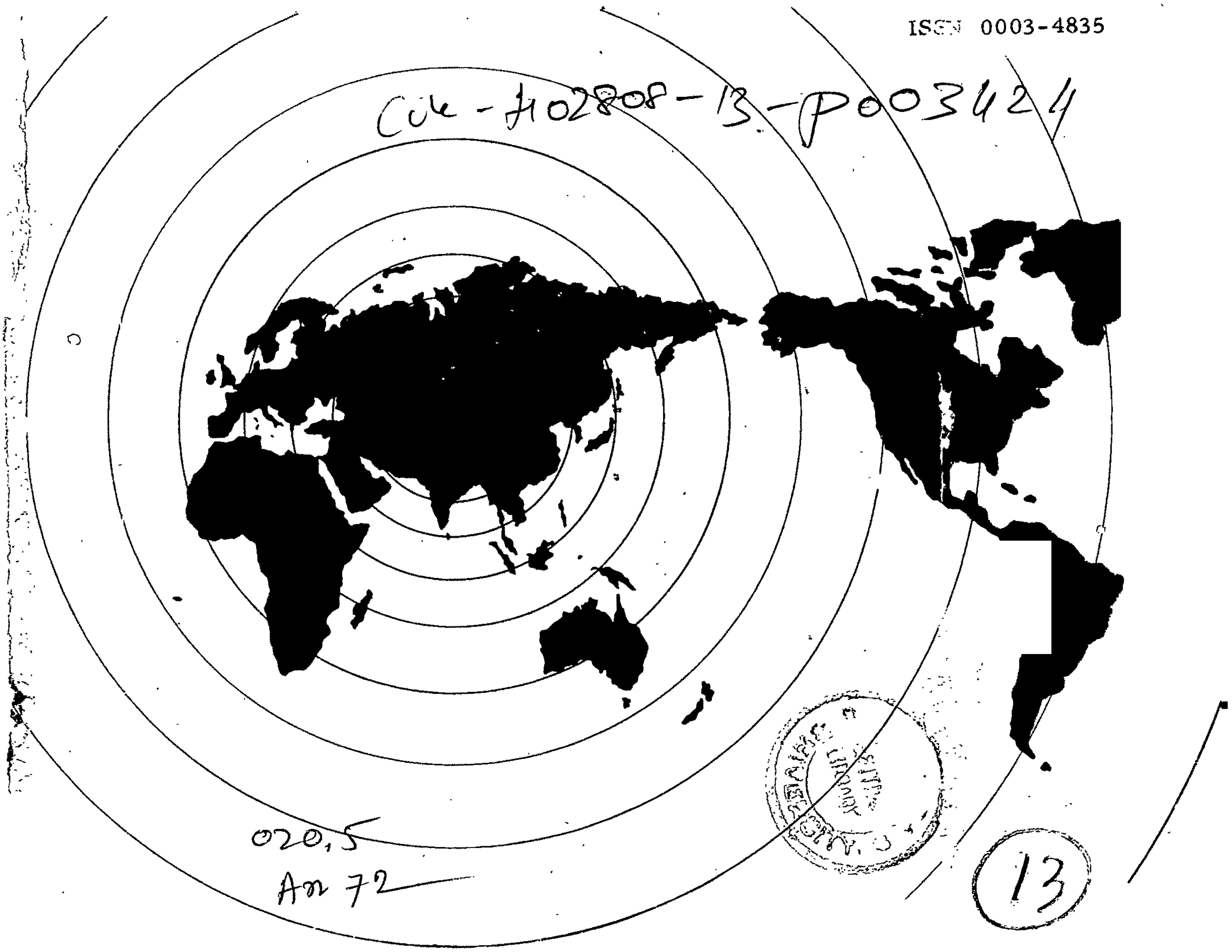

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1980, 27(1-4), 1-11.

INFORMATION FOR SMALL INDUSTRY: A SURVEY

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Presents the results of a survey carried out with a sample of 51 small scale industrial units situated in and around the twin cities of Hyderabad and Secunderabad for identifying (i) role of information & information activities in the small scale industries; (ii) role of various agencies in the industrial information transfer; (iii) specific information services & products which they require & the sources they tap to obtain these information & for creating an awareness among them about the information activities of the country & also for eliciting their suggestions. Suggestions of the respondents have been listed. The need for building up a more effective national network of industrial information has been emphasised. Management, staffing, function, etc. of local information centres of industrial estates areas have also been outlined.

The process of industrialisation of a country, state or a region and thence the improvement of national economy depends on the extent, type as well as on the effective utilisation of the resources. Industrial information is one of the most important of these resources, since the exploitation of other resources depends upon it. Information is an essential input to the small industries development programme, whether in promoting entrepreneurship or in increasing the effectiveness of the performance of established industries. But the information requirements of small scale enterprises are little known and poorly understood.

Considerable activity is now taking place in planning of national information system, optimum utilisation of existing information systems and services and development of new systems and services. In this connection, it would be appropriate to find out not only the information needs of small entrepreneurs but also their views on the type of services which would be relevant to them for rational decision making.

It is the responsibility of the industrial information workers to interact constantly with the entrepreneurs and to streamline the process of information communication to industry. In order to facilitate the effective communication of industrial information, the information workers need to conduct periodic surveys which would enable them to get acquainted with the needs and problems of the entrepreneurs. Here, in the succeeding sections the details of such a survey conducted for this purpose and the results obtained are presented.

OBJECTIVES OF THE SURVEY

The broad objectives of this experimental study were:

- To identify the role of information in small scale industries.
- To identify the overall information activities and problems in small scale industries.
- To identify the main sources in which they locate useful information and topics on which they need information.
- To identify the role of various industries, associations, special libraries/information centres and other governmental agencies in the transfer of industrial information.
- To identify the specific information services and products in which the small entrepreneurs are usually interested.

- To stimulate the intake of industrial information by the small entrepreneurs by making them aware of the present day information activities in the country.
- To get their general opinion about the present day information services in the country and their suggestions in this connection.

SCOPE OF THE SURVEY

This survey is confined to the small scale industries situated in and around the twin cities of Hyderabad and Secunderabad. The total number of respondents are 51 out of which 15 are from chemical units, 12 are from mechanical units, 9 each from electrical and electronics units and 6 are from miscellaneous units which include the units manufacturing cotton and industrial yarns, optical instruments, flow meters, ceramic products, sports goods and rubber mouldings.

METHODOLOGY OF THE SURVEY

1. Designing the Questionnaire

The questionnaire was first designed and circulated among 15 small entrepreneurs who manufacture different types of products with a view to modifying it after getting the feedback from them. Thirteen out of 15 questionnaires were collected with the respondents' feedback and then the original questionnaire used in this survey was designed, which is exhaustive enough to cover all the objectives mentioned in the preceding section of this chapter, together with general information on the units and the respondents. Certain "check questions" on some aspects were also included and purposefully placed at odd places.

2. Sampling

The first step after designing the questionnaire is to select the units. The sampling technique applied here is "random sampling". The application of the random sampling technique for the purpose of this survey can be justified with the following arguments:

Small scale industries need variety of information on variety of aspects from time to time. Different industries may manufacture different products i.e. some of them may manufacture chemicals, some of them electrical items, some may manufacture electronics items and so on. The small industry products today range from an ordinary 'nut' to sophisticated 'electronic calculators'. Take, for example two units, one manufacturing chemical products and the other manufacturing electrical items like "switch gears". Both the above units require what is called "technical information", which includes production processes, production problems and some technological developments. The actual content of the information surely varies, but in the view of the information worker, it is essentially technical information in either case. Likewise, some units may require information on the regulations involved in the use of industrial alcohol and some units may require information on the regulations involved in the use of boilers, which essentially falls under regulatory information in both the cases. Some units may require information on insurance health facilities available for their employees and some may require information on group insurance schemes available which essentially come under personnel information.

Further, the investment pattern also varies from one small industry to the other, but the investment of all small scale industries is well below or just up to the mark that was laid down by the definition of the small scale industry.

The above mentioned points clarify that for the information worker, the characteristics of all small scale industries, irrespective of the products they manufacture are the same. It can also be said that they operate in the same environment. Therefore, the random sampling technique applied for this study can be justified on the basis of the above enunciated points.

A careful consideration of all the sampling techniques revealed that the random sampling technique used in this study is more practical and meaningful and serves the purpose adequately.

RESPONSE FROM THE SMALL ENTREPRENEURS

Actual field work was started in April 1979, when the questionnaires were submitted to the units. Each of the questionnaire filled in by the entrepreneurs was scrutinised carefully and internal discrepancies and inconsistencies, if any, were discussed with industrialists to get necessary clarification and plausible explanations which were incorporated in the questionnaires. The field work was over by the end of August 1979.

The long spread period of the actual field work was due to a number of difficulties faced in the work. Firstly, it was found to be difficult in majority of the cases to locate the units and to contact the responsible person for getting the information required. In many cases the address obtained was insufficient and it became difficult to locate the number of the building. Even after locating the units, many more visits were necessary to contact the responsible person. Some units repeatedly reported the absence of the proprietor/manager. Some proprietors/managers granted time for the interview, but were found to be repeatedly not available at the given time. Some of them bluntly refused to give the required information. Due to these reasons, the questionnaires were submitted only to 90 units out of the total sample 130 selected for submitting the questionnaires. All the entrepreneurs to whom the questionnaires were submitted were given 15 days to fill in all the information. But in most of the cases they took more than one month to return the filled questionnaires. Some of the industrialists, even after repeated reminders and personal visits, could not keep up their promise. These units were ultimately discarded from the list. The total number of industrialists who had responded were 51 out of 90 to whom the questionnaires were given.

It must be stated that some industrialists did understand the vital importance of a survey of the present type and supplied all the information willingly. Some of them went ahead and acquainted us with the peculiar problems of their units, commented on the present state of the information services in the country, and requested emphatically to include suitable suggestions and recommendations in the present work.

During the course of further analysis of the data collected, whenever any clarifications were required or more elucidation was desired on certain peculiarities observed, some of the respondents were contacted a number of times and it must be noted with gratification that they did spare their valuable time to discuss the points placed before them.

SUGGESTIONS FROM THE RESPONDENTS

Twenty three respondents have expressed dissatisfaction about the present day industrial information set up in the country. They feel that there should be a good centralised system with reprographic facilities in each and every industrial city. These systems should supply specialised product line information and industrially experienced persons should be made incharge of these centres. They have also suggested that improvements must be made in coordinating the efforts of various agencies in this line.

Seven respondents from electrical and electronics units have stated that major research in their sphere of activity is being done in Russia, Japan and West Germany and many developments are being reported in these languages. They have suggested that national industrial information services should also take the responsibility of translating these articles into English and other local languages and supply the same to the concerned entrepreneurs.

Eighteen respondents have suggested that special libraries/information centres should provide lending facilities which will enable them to study the subject matter of their interest without wasting much of their time.

Two respondents feel that the present working of information centres of various agencies is medium scale oriented and tends to be a little too western at times and irrelevant to the local conditions. They suggest that there is a requirement of a system which can provide appropriate and basic information and data relevant to the local conditions at a very nominal cost. Such a system should necessarily embrace both technical and commercial aspects of small industry management.

One respondent feels that due to the fast rate of industrial growth, particularly small scale sector, the competition is increasing. He suggests that there is a need to restructure the whole industrial information set-up and to make the entrepreneurs aware of the latest technical and other commercial developments.

One respondent suggests that task forces may be set up in national information services which would keep monitoring the running of small industries and tackling the problems as and when they come.

Almost all the respondents feel that there is a need to set up an information system which would take care of market trends of different products and supply this information to the required entrepreneurs. They have also felt the need to streamline the publication and communication of regulatory information.

CONCLUSIONS OF THE SURVEY

Information qualifies as a major input and becomes a common factor in decision making and overall control in small scale enterprises. All the respondents have agreed that the information generated within their organisations as a result of day-to-day operations is as important as the external environmental information and felt the need for a formal organisation of it.

Small scale industrialists do not allocate fixed budget for procuring information material and they acquire it as and when the need arises. Out of the five industry groups considered, electronics units are spending more money for procuring information material. This is due to the fact that the electronics field is taking roots in India presently and the publications in this field are yet to be streamlined (i.e. they are procuring more number of foreign periodicals). Almost all the small entrepreneurs depend on various sources outside their organisations viz. people engaged in similar type of business, different associations, special libraries/information centres, consultants and research institutions for their information needs. It appears that the degree of dependence on these sources is more than 50 per cent of their overall needs. The tendency of the small entrepreneurs is to procure the information material which would have immediate bearing on their activities and due to this, they are ignoring the developments (both technical and commercial) which would affect their activities in the long-run.

There is a general agreement among the respondents that they do face different problems in acquisition and organisation of their information material even though the quantum of it is very small and they are keen to organise the same. This suggests that there is a need to implement the techniques of documentation even in small industries to facilitate easy retrieval of information. In a majority of the sample units, informal information services like --lending documents within the firm, circulation of books and periodicals and literature searches are being conducted.

The sources in which small entrepreneurs locate useful information are different types of periodicals, books and other reference material, publications brought out by different associations and they also approach different consultants. The topics on which they need information regularly are marketing; product diversification and development and various government regulations. The topics on which they need information occasionally are production problems, safety, records management,etc.

All the small scale industrialists depend on several sources outside their organisations for their information needs out of which the people engaged in similar type of business appear to be the most sought-after source. This shows that the entrepreneurs in the first instance tend to contact some people to solve their problems. Therefore, there is a need to motivate the entrepreneurs to depend more on documentary sources.

All the small scale entrepreneurs are conscious of utilising the existing special library/information service facilities available in the country. Even the entrepreneurs who are not in a position to spare time to visit libraries are aware of the usefulness and resourcefulness of libraries in solving their commercial and technical problems.

The information services which the entrepreneurs need are - providing answers to their queries, newsletters on a particular industry group like plastics, fine chemicals, ceramics etc., news briefs which notify about the current developments in the field of their interest, technical digests which notify all the scientific and technological developments in a particular field, providing a list of abstracts/summaries of latest articles and management digests which inform about the latest trends in management. All the respondents have indicated their willingness to pay for such services.

The formats of presentation of information to the entrepreneurs are-a periodical form, a service that notifies about the printed information which will be supplied on request and a sheet confined to a single topic.

Small entrepreneurs are finding it difficult to obtain the information on topics like product diversification and development, marketing information and government regulations.

BUILDING UP A MORE EFFECTIVE NATIONAL NETWORK OF INDUSTRIAL INFORMATION

1. Need for Local Information Centres in Industrial Estates/Areas

The fundamental characteristics of Indian small industry are their wide dispersal throughout the country and a wide diversity in the nature of the products that are being manufactured. It has been seen that small industrialists are constrained to limit their expenditure on procuring information material and to conduct their information activities in an organised way. Therefore, they depend on various governmental and other agencies for obtaining the required information. Several efforts are being made by the Government in building up a national network of industrial information to facilitate effective transfer of information to start and to operate small industries efficiently. The effectiveness of this network depends on the coordination between the industry and various organs of the network, i.e. it does not suffice setting up different agencies and providing linkages among themselves. It is fundamental to link the whole network of industrial information with the small industries of different regions to facilitate the meaningful exchanges between the industry and the agencies. This suggests that there is a need to establish coordinating information systems at the tail-ending stage of the information transfer system. If knowledge is regarded as a commodity that should be supplied to industry in the same manner as goods distributed to consumers. The effective distribution depends on the efficiency of the distribution system. Effective distribution is not possible unless there is a coordinating system at the consumer's end. In the case of industrial information services, the users are entrepreneurs and unless there is a co-rdinating system at their end, it is not possible to accomplish effective and smooth transfer of industrial information. In other words, to ensure that the information required can be made available to small industry, it is essential to establish local information transfer services in the industrial estates/areas whose structure and coverage will depend on numbers and types of industrial units in a particular industrial estate/area e.g. an industrial estate in which such a local information centre is set up and is linked up with various other centres which are engaged in supplying different types of information to small industry. This centre will act as a supplier and demander of information, i.e. this centre will collect (demand) information from national industrial information services and other similar agencies and supply it to industrialists besides collecting and building up its own information resources. Here, a pragmatic approach is presented for building up such information centres in industrial estates/areas.

2. A Pragmatic Approach

It has been seen that all the entrepreneurs are spending different amounts for procuring information material to meet the information requirements of their organisations. Besides this, they are also depending to a large extent on different sources outside their organisations for their information needs. Instead of conducting the information activities individually, all the entrepreneurs in an industrial estate/area can pool their resources and coordinate their activities to build up a centralised information system and the approach presented here is based on this logic.

Consider, for example, for entrepreneurs who manufacture electrical items in an industrial estate and both of them are procuring 4 periodicals each on a continuous basis in which the titles of two periodicals are the same. Consider that they also procure some books and other reference material like handbooks, manuals, etc. out of which some are common. Now, if these two units pool their resources and conduct their information activities in a coordinated way, they can avoid the procurement of one set of common material. This money can be utilised for procuring some more information material relevant to both the units. In other words, this sort of coordinated approach enables to enrich their information resources besides reducing their dependence on sources outside their organisations. Similarly, if all the units in an industrial estate/area pool their resources and organise their information activities in a coordinated way, it is possible to build up a centralised information system for that particular estate. The success of this approach depends more on the involvement and coordination extended by the concerned entrepreneurs. Such information centres during the process of growth not only build up a good collection of their own, but also establish linkages with several other national, regional and local information agencies and help to accelerate the transfer of industrial information to small industries. This approach will surely lead to building up an effective national network of industrial information. Such local information centres in industrial estates/areas can be called - "Industrial Estate Information Systems" (IEISs).

3. Role of Governmental and other Agencies in Developing IEISs

Since the exploitation of the available knowledge and know-how is of fundamental importance to the process of industrial development, Government must accept the responsibility for the transfer of information to industry in the same spirit that they accept the responsibility for economic development itself. Industrial information services require Government support. At present, all such services are partly or wholly subsidised by the Government. Government and national industrial information services should also accept the responsibility for establishment and operation of local information transfer services in industrial estates. The success of IEISs programme depends to a large extent on the role played and cooperation extended by the concerned governmental agencies and departments.

Firstly, the entrepreneurs need to be motivated to recognise the vital importance of establishing IEISs. The State Government authorities like Directorate of Industries should assume the responsibility of motivating the entrepreneurs and if necessary, they should also make it obligatory on the part of the entrepreneurs to participate in IEISs development programme.

Secondly, to start with, the Government should assume the responsibility of providing financial support for constructing building and for procuring necessary equipment to IEISs.

Thirdly, the national industrial information services can draw up detailed schemes in establishing IEISs. These schemes include the methods of organising the information material, assisting IEISs in drawing up their acquisition policies and planning different information services to member units. Further, they will have to coordinate their activities continuously with IEISs by supplying the required information. Various regulatory bodies also should establish communication links with IEISs and supply the regulatory information from time to time. The national industrial information services can also perform a very important function of training the staff members of IEISs.

4. Management and Staffing of IEISs

Almost every industrial estate would have the Industrial Estate Manufacturers Association constituted by the elected office bearers from the entrepreneurs. A separate committee can be appointed either from these office bearers or by electing the office bearers from the member entrepreneurs to look after the management affairs of IEISs. This committee can be called "Managing Committee" and from time to time would look after the policy issues concerning IEISs. The functions of the Managing Committee will include - fixing the amount that should be contributed by each member entrepreneur, deciding on the acquisition policy of information material, deciding on the services to be rendered, etc. The committee would also conduct general body meetings from time to time to decide on various issues that may arise during the operation of IEISs. Besides this, the committee would decide from time to time on matters regarding the sort of linkages that should be established between IEISs and various other agencies. In a nutshell, the Managing Committee would control and coordinate the overall activities of the IEISs.

One of the first decisions to be made is the number of staff members required for the level of service wanted. In the initial stage, the IEISs unit can be staffed by one professionally trained person with some industrial experience aided by administrative assistant (cataloguer). As the use made of publications grows and the size of the collection of materials expands, one person cannot be expected to do everything adequately. Other staff members, both professional and clerical, must be employed to take over different activities and render specialised services required by the entrepreneurs.

5. How IEISs should Function

To start with, each member entrepreneur will contribute the amount of money specified by the Managing Committee and this will become the financial input for the IEISs. For example, if there are 100 units in an industrial estate/area and each one contributes Rs. 2000-3000 in the beginning and continues to do so every year, the total amount will be Rs. 2-3 lakhs per year which will be adequate enough to set up and operate a sound information centre.

The present holdings of all the member entrepreneurs (books, periodicals etc.) will form the primary input. Later on, the centre will acquire books, periodicals and other information material to cater to the needs of each individual member unit. The acqquisition policy and other issues can be reviewed from time to time by the Managing Committee in consultation with the head of the centre.

The staff of the centre, from time to time, would device the necessary information services to the member entrepreneurs. They also can process and evaluate the information and maintain an index for the relevant information. Lending facility of books and periodicals can also be provided to member entrepreneurs. Books and periodicals can be displayed in the centre to facilitate the entrepreneurs and their staff members to go through them and obtain the required information. Besides these, they can render a very important service of answering the technical queries posed by the member units. In case the queries fall outside the purview of the system, they would contact various other agencies and/or institutions where the information is available and supply it to the concerned entrepreneur. Apart from these services, these centres will constantly coordinate their activities with national industrial information services and other regulatory bodies to obtain the relevant information. In short, the IEISs will take care of the overall information needs of each member entrepreneur.

6. Common Benefits that Entrepreneurs Can Derive out of IEISs

The establishment of IEISs would relieve the entrepreneurs of the burden of acquiring and processing the information material. The IEIS will take care of all the technical and commercial developments and each one will be supplied with the relevant information from time to time.

With the limited amount that each entrepreneur contributes, he will have access to more number of information sources in his sphere of activity and can also avail himself of the lending and various other services which would be rendered by IEISs.

Since the location of IEIS is in the industrial estate itself, the entrepreneurs need not spend much of their time even if they want to make a personal visit to the centres to obtain the required information.

These centres on behalf of each entrepreneur will keep contact with various agencies, regulatory bodies and other institutes and this will eliminate the problem of entrepreneurs contacting these agencies individually.

APPENDIX

Questionnaire for Surveying the Information Needs of Manufacturers.

1. Name

2. Designation

3. Qualifications & experience.

4. Name and address of the organisation.

5. Year of establishment.

6. Type of organisation (Please tick one)
   - Private company
   - Partnership
   - Sole proprietorship
   - Public limited company
   - Subsidiary of large company
   - Others (please specify)

7. Nature of activity (please tick in appropriate square)
   - Manufacturing and selling own products ☐
   - Manufacturing under contract ☐
   - Selling goods made by others ☐
   - Providing services (such as repairing) ☐
   - Consultancy ☐
   - Others (specify) ☐

8. Type of products manufactured.

9. Could you give the number of employees in each of the following departments.
   - Administration ------------
   - Production ------------
   - Research & Development -------------
   - Marketing & sales personnel ----------
   - Others ---------------

   Total employees -------------

10. (a) If you are a member of the following types of organisations please tick the relevant type and write the name of the organisation.
   - Trade association
   - Professional association
   - Commercial association
   - Other institutes, associations
   - Not a member of any association or institution.

    (b) If your organisation is a member of the following types of organisations please tick the relevant type and write the name of the organisation.
   - Trade association
   - Professional association

- Commercial association
- Other institutes, associations
- Not a member of any association or institution.

11. Please indicate the annual budget of your firm for procuring books, periodicals, technical reports, standards, trade catalogues and others.

Rs. 0 - 500

Rs. 500 - 1000

Rs. 1000 - 5000

Rs. 5000 - 10,000

Rs. 10,000 - 25,000

Rs. 25,000 - 50,000

More than 50,000

12. In your opinion is the quantity of above mentioned material coming to your organisation.

- About right
- Too little
- Too much

13. How much time do you spend per day/per week/per month in going through the above material.

14. Please indicate the order of preference by numbering (1) to the most suitable one and (4) to the least suitable one to the following question -

Do you think that the money spent on acquiring information material

- forms one of the essential inputs to your organisation.
- supports your decision making.
- helps to solve technical, commercial & other day-to-day problems.
- helps in organisational growth.
- others, please specify.

15. If you find anything of interest in the printed material, how do you use the information.

- Read it and then discard it
- Keep it for further reference
- Seldom find anything of interest

16. In which of the following sources do you locate the useful information.

- Books
- Journals (Trade, technical, etc.)
- Newspapers
- Advertisement brochures
- Standards
- Trade, professional, commercial associations & their meetings and publications.
- Handbooks
- Research institutes
- Work manuals
- Consultants
- Banks and financial institutions
- Other people engaged in similar type of business.
- Others, please specify.

17. On which of the following topics your organisation needs information regularly and occasionally.

	Regularly needed	Occasionally needed
- Production problems		
- About the activities of the competitors		
- Relevant technological innovations.		
- Market trends.		
- Product diversification		
- Trade statistics of your products.		
- Records management		
- Tenders and contracts		

- Managing employees.
- Office and factory equipment
- Prevention of accidents
- Government policies and other regulatory information.
- Others, please specify.

18. A lot of data is generated within an organisation as a result of day-to-day operations like production and sales figures, production schedules, experimental results of R & D, performance reviews, payrolls, balance sheets, etc. These are highly essential for decision making at top corporate level, to assess past performance and to predict future trends. Please indicate your view.

a) Please indicate the mode of organisation of the above type of data in your organisation.

- Department-wise
- Centralised
- Separate record keeping
- Other forms, please specify.

b) What type of information do you consider more important.

- internal information
- external information
- both internal and external
- none of the above

19. If you have a collection of books, reports and other documents what are the specific problems in

a) acquisition of documents

b) processing of documents.

c) storage of documents to retrieve when information is needed

d) servicing of documents.

20. What services are being offered (please answer Yes/No.)

a) Bringing out accession list of publications added to the library? Yes/No

b) Circulation of books and periodicals Yes/No

c) Lending documents within the firm Yes/No

d) Literature searches Yes/No

e) If any other services are offered, please specify.

21. If you have a collection of books, reports, etc. and information services are being offered, what is the strength of the staff both professional and non-professional (in the library/information centre).

22. How far does the library/information unit of your organisation meet your information needs.

- Completely
- about 75%
- about 50%
- about 25%
- Not at all

23. When you seek information which falls outside the purview of your system, which of the following sources you are most likely to tap.

- a library
- a consultant
- any Government agencies
- a research institution
- a trade or professional association
- someone outside who is engaged in the similar type of business
- Others, please specify.

24. Please indicate how often you sought assistance or information outside your business/organisation.

- once in a week

- once in a fortnight
- once in a month
- once in 3 months
- once in 6 months
- once in a year
- Seldom sought any information

25. When seeking this information from an outside source do you.

- Write
- Telephone
- Make a personal visit

26. Have you ever visited or contacted a library/information centre for any information in connection with your organisation.

Yes/No

27. If not,was it for any of these reasons (please answer this question only if you have ticked 'NO' in question 26).

- You have all the information you need in your organisation
- You did not think a library would have sufficiently practical information.
- You feel it would take too much of your time to find the information you wanted in a library
- You get the information from other sources
- Others, please specify.

28. If you had sought information from an outside library/information centre, did you find what you were looking for.

Yes

No

Only part of it

29. If you are a member of trade or technical association when you have queries, do you normally

- Find answer in the printed information that has been sent out by the organisation.
- Telephone the trade or business association.
- Contact someone else not connected with your trade or business association.

30. Below are listed a number of ways by which information might be made available to you. Could you indicate which ways you would prefer, numbering 1 to the most preferred and 6 to the least preferred.

1 2 3 4 5 6

- Periodical type
- by a service that notified to you of printed information likely to be of interest to you, which is available on request.
- on a sheet confined to a single topic
- by a visit to library
- in a folder with a number of loose sheets each concerned to a single topic.
- by a telephone call to an information centre which could give answers to some enquiries and direct you to person who could give information on more specialised enquiries.

31. If an information centre is set up which is capable of supplying information of value to your organisation -

a) Which of the following services you would like to have. (Please tick)

- Answering technical queries (this service is intended to provide answers to your specific technical or commercial problems by literature searches. This includes supplying the list of manufacturers/suppliers of raw materials, machinery, other items of interest to you, and trade statistics of particular items, etc.
- Providing a list of titles of latest articles in your sphere of activity and which are likely to be of interest to you.

- Providing a list of abstracts(summary) of latest articles in the sphere of your activity.
- News briefs, which notify you about the current developments in technical, commercial field of your interest.
- Technical digests which notify all the scientific and technological developments in your field of activity.
- Management digests which keep you informed about the trends in management of production, maintenance, personnel, etc.
- Data sheets in the form of graphs, illustrations, tables , and other data.
- State-of-the-art/trend reports which give the information about status of particular item, or particular group of items in terms of scientific and technological, demand and supply, future projections, etc.
- Bibliography which provides a list of all relevant articles, books, patents, etc. on any specific topic of your interest.

b) Will you be prepared to pay for such services?

c) Whether you need such services at all.........

32. In order to get a better idea of your information needs, could you give an outline of problems, which remain unsolved in your business.

- Technical
- Marketing
- Productivity
- Finding sources of supply of raw materials/machinery and equipment.
- Diversification or new product line.
- Regulatory information.
- Others, please specify.

33. Have you additional remarks/comments concerning your information requirements, problems in obtaining the required information, the forms in which useful information is/should be made available etc?

Signature.................

Name: ....

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DEGREE COLLEGE LIBRARIES IN KASHMIR: A SURVEY

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Presents the overall picture of the degree college libraries of Kashmir. Points out certain problematic factors requiring consideration and suggests certain measures to improve the standards of college library services in Kashmir.

1. INTRODUCTION

Kashmir, the paradise on earth, is at par with other parts of the country as far as the number of degree colleges-with academic pursuits-is concerned. The libraries attached to these degree colleges are academic in nature. At present there are thirteen degree colleges imparting education, leading to the Bachelor's Degree. They are as follows:

Colleges at Srinagar

1. Sri Pratap College, Srinagar.
2. Amar Singh College, Srinagar.
3. Gandhi Memorial College, Srinagar.
4. Govt. Degree College for Women, Maulana Azad Road, Srinagar.
5. Govt. Degree College for Women, Nawa Kadal, Sringar.
6. Govt. Degree College, Bemina.
7. Vishwa Bharati Women's College Rainawari, Srinagar.
8. Islamia College, Sringar.

Colleges at Anantnag

1. Govt. Degree College, Anantnag.
2. Govt. Degree College for Women, Anantnag.

Colleges at Baramulla

1. Govt. Degree College, Baramulla.
2. Islamia College for Women, Sopore.
3. Govt. Degree College, Sopore.

The purpose of this paper is to bring to light the facts regarding the libraries attached to these degree colleges. For this purpose a questionnaire (Appendix G) was sent to all the libraries and some of the libraries were personally visited by the author.

2. RESULTS OF THE SURVEY

Out of thirteen degree college libraries only ten responded. Hence, the information given below, though based on the responses received from these ten libraries, gives the over-all picture of all the degree college libraries in Kashmir.

21. Collection

The survey (Appendix B) reveals that Amar Singh College Library (established in 1942) tops the list, stocking the largest collection of about 38,000 volumes. This is followed by Sri Partap College Library (established in 1905) stocking about 30,296 volumes. Keeping in view the number of clientele and the number of years these libraries have been serving for, it is evident that the acquisition rate has been very slow and the present strength of the collection is not adequate to meet the needs of their clientele.

The collection mainly comprises books and a few journals. Reference collection in the form of encyclopedias, dictionaries, indexes, abstracts, etc. gets a secondary importance in these libraries, that stock mainly textbooks.

211 . Selection Procedures

Documents are selected by the heads of various teaching departments of the college in consultation with other members of the teaching faculty. The librarian, who is closely associated with the clientele of the library and hence knows their needs and requirements, is seldom asked to participate in such activities.

212. Technical Procedure

The collection in almost all the libraries is classified according Dewey Decimal Classification Scheme and catalogued according to Anglo-American Cataloguing Rules.

213. Access System

Majority of the libraries follow closed access system (Appendix C). Libraries of Govt. College for Women, M.A. Road, Srinagar; Islamia College, Srinagar and Islamia College for Women, Sopore, however, follow open access system. Govt. Degree College, Sopore library follows semi-open access system.

214. Circulation System

Almost all the libraries still follow the old and traditional ledger system for issue and return of books (Appendix C). However, Islamia College Library follows Browne's System and Islamia College for Women Library, Sopore follows Newark system.

Students can borrow two books at a time, for just fourteen days, whereas the teachers can keep any number of books for any span of time. With the result, books of latest editions or of high costs are always with teachers and students never get any access to such materials.

22. Reading Facilities in the Library

Each library is having a reading hall, the seating capacity of which differs from library to library depending upon the number of clientele (Appendix D). Islamia College Library has the largest seating capacity for 150 readers followed by Amar Singh College Library having a seating capacity for 110 readers. Lowest seating capacity is in Islamia College for Women Library, Sopore, which has got a seating capacity for 26 readers only.

23. Staff

All that these libraries have by way of staff is just one professional i.e. the Chief Librarian, and two or more non-professionals to look after every activity going on in the library (Appendix E & F). Although trained personnel are available, it is unfortunate that the college authorities pick up the most talented personnel only for other departments of the college, and manage with these non-professionals in the library-the heart and soul of the college. It seems that there is no clear cut policy or a well-defined criteria for selecting library personnel. This is evident from the fact that some degree college libraries are headed by librarians with no professional background or simple certificate holders in library science. How a librarian with such a background can justify the causes of his library before the college authorities? Obviously, the college authorities appoint some other persons generally the head of some teaching department as the overall supervisor of the library. Thus it is the non-professional head who manages various library activities and services, and the so-called librarians have no say anywhere in the college in any matter relating to the library.

24. Stock Verification

The process is carried out in almost every library. Some verify their stocks yearly, some three yearly, and some five yearly and so on. Losses are written off in majority of the cases. In some, entire staff and in some, only the librarian has to compensate for the loss. Since the libraries in general follow closed access system, huge losses mean nothing but gross negligence on the part of the librarian and the library staff. However, for negligible losses, depending upon the daily issues and returns, periodicity of stock verification and cost of the lost documents compensation is not proper.

25. Library Hours

Library hours are the same as those of college hours, i.e. generally from 10 a.m. to 4 p.m. Libraries remain closed on Sundays and other holidays. However, Govt. College for Women, Nowakadal library remains open upto 7 p.m. on all working days.

26. Library Building

Libraries in almost all the degree colleges are housed either in some department which is primarily meant for some other purpose in some section/department which is unfit for any other purpose (Appendix B). Sri Partap College and Govt. Degree College, Baramulla, however, have separate buildings for their libraries. The idea that the library should be at the centre of the college and be easily accessible to readers, has been ignored in case of our degree colleges. With some exceptions, lighting and some other arrangements in these libraries are a source of hindrance rather than a source of attraction for the readers to visit the library.

27. Library Budget

The survey reveals that the libraries do not get what is due to them in terms of finance (Appendix c). The budget of Islamia College Library is Rs. 20,000. This budget, maximum of almost all the libraries, seems to be inadequate keeping in view the strength of the reading clientele the library is to serve. Similar is the position with the other libraries. The budget for Govt. College, Bemina Library is Rs. 5,000/- only. This means that the library is bound to purchase cheap material in terms of books and periodicals, etc. and cannot afford to acquire standard reading material. What to talk about Gandhi Memorial College that has only Rs. 1000/- as its budget!

3. PROBLEMATIC FACTORS REQUIRING CONSIDERATION

1. Collection is out-of-date and mostly comprises textbooks.
2. Journals get a secondary importance in these libraries. No journal on current trends in librarianship etc. is subscribed to by any library, except one or two.
3. Standard reference material is not acquired to the satisfaction of the readers.
4. Readers are not provided with any other services except circulation of books.
5. Circulation systems adopted are defective and mostly outdated.
6. Teaching is very much textbook oriented which does not promote proper utilisation of library resources and library services.
7. Library rules are not properly framed and implemented. There is no limit to the number of books a teacher can borrow and no limit of time for which he can keep them.
8. Libraries do not have separate buildings, in majority of the cases.
9. Most of the library staff members, except the chief librarian, are non-professionals.
10. The non-professional, who is the head of some teaching department is appointed as the head or chief of the library.
11. Some college authorities complain that even the trained professionals in the libraries are not competent enough to plead and justify the causes of their libraries.
12. Closed access system, prevalent in most of the libraries creates obstructions for readers to get desired documents.
13. Library staff and in some libraries, only the chief librarians are held responsible for the losses in the library.
14. Out of the total budget of the college due share is not given to the libraries.
15. The strength of the collection is not adequate to suit the requirements of the clientele of the library.
16. Librarians are not given sufficient financial powers.
17. There is no uniformity in the selection procedure, status and salary scales of the library staff, especially the chief librarians (Appendix F), of the various degree college libraries in Kashmir.
18. Librarian's suggestion regarding various matters pertaining to the library especially document selection activities etc. is seldom sought.
19. Working days and hours of the libraries correspond with the working days and hours of the colleges,thereby depriving the reading clientele, especially resident students, of the use of the library after college hours and on holidays.

4. SUGGESTIONS

1. Practice of appointing non-professionals for the libraries should be abolished and measures be taken for deputing in-service non-professionals for professional training. Selection of library personnel should be guided by a well-defined selection criteria.
2. Overall supervision of the library should be in the hands of the chief librarian and non-professionals should not be appointed for this purpose.
3. Open access system should be introduced without any further delay.

4. Library hours should be increased and libraries should remain open on Sundays and other holidays.

5. Libraries should have separate buildings built on modern lines.

6. Provision of book banks be made in all the libraries wherefrom text books can be issued to poor and needy students on full term basis.

7. Reference service must be initiated at the earliest.

8. Librarians should know something more than mere classification and cataloguing of books.

9. A plan for regular weeding out of unused material should be introduced.

10. A permanent policy regarding writing off of books be framed. In this connection U.G.C. recommendation i.e. - 4 books per thousand issued be treated as negligible loss- may be implemented. Librarians and library staff should not be held responsible for the loss.

11. Libraries should get their due share out of the total budget for the colleges. Here again U.G.C. pattern may be followed. U.G.C. recommends that 4% of the college budget be allocated for their libraries. Out of this 20% may be spent on journals 20% on staff and 60% on books and binding.

12. There must be uniformity in various library operations and activities in all these libraries.

13. All the degree college libraries should co-operate with each other so as to mutually benefit from each other.

14. Libraries should arrange for book exhibitions, book displays, etc. to promote use of the library.

15. Fresh students be introduced to the library, its activities and services. For this purpose the chief librarian should be given chance to deliver lectures, etc.

16. Facilities of library staff on examination and other similar duties, should be similar to that of other staff members of the college.

17. Status and salary scales of the library staff should be at par with the teaching faculty of the college. Chief Librarian, holding a very responsible post, should be placed at par with the professor/ head of the department of the college.

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APPENDIX (A)

LIST OF ABBREVIATIONS USED

S.No.	TERM	ABBREVIATIONS
1.	Sri Partap College Library, Srinagar	SPCL
2.	Amar Singh College Library, Srinagar	ASCL
3.	Govt. College for Women Library Srinagar.	GCWML
4.	Govt. Degree College Library, Sopore.	GCSL
5.	Govt. College for Women Library,Nawakadal.	GCWNL
6.	Islamia College Library, Srinagar.	ICL
7.	Govt. Degree College Library, Baramulla.	GCBL
8.	Islamia College for Women Library, Sopore.	ICWL
9.	Govt. Degree College Library,Bemina,Srinagar.	GCBEL
10.	Gandhi Memorial College Library, Srinagar.	GMC
11.	One Reading Room.	RR

APPENDIX (B)

YEAR OF ESTABLISHMENT, PRESENT COLLECTION AND LIBRARY BUILDING

S.No.	NAME OF THE LIBRARY	YEAR OF ESTABLISHMENT	PRESENT COLLECTION	LIBRARY BUILDING
1.	SPCL	1905	30296	Separate
2.	ASCL	1942	38000	Attached
3.	GMC	1943	11000	-do-
4.	GCWML	1950	-	-do-
5.	GCSL	1951	17860	-do-
6.	ICL	1960	22000	-do-
7.	GCWNL	1961	20000	-do-
8.	GCBL	1963	20000	Separate
9.	ICWL	1971	-	Attached
10.	GCBEL	1973	3521	-do-

APPENDIX (C)

ACCESS SYSTEM, CIRCULATION SYSTEM & BUDGET

S.NO.	NAME OF THE LIBRARY	ACCESS SYSTEM	CIRCULATION SYSTEM	BUDGET
1.	SPCL	Closed	Ledger	9000
2.	ASCL	Semi-open	-do-	-
3.	GMC	Closed	-do-	-
4.	GCWML	Open	-do-	
5.	GCSL	Semi-open	-do--	10000
6.	ICL	Open	Browne's	20000
7.	GCWNL	-	Register	8000
8.	GCBL	Closed	Ledger	10000-12000
9.	ICWL	Open	Newark	10000
10.	GCBEL	Closed	Ledger	5000

APPENDIX (D)

STRENGTH OF THE CLIENTELE/AVERAGE NO. OF DAILY VISITORS & SEATING CAPACITY.

S. No.	NAME OF THE LIBRARY	STRENGTH OF THE CLIENTELE		AVERAGE NO. OF DAILY VISITORS	SEATING CAPACITY
		STUDENTS	STAFF		
1.	SPCL	-	-	-	-
2.	ASCL	1500	200	200	110 Readers
3.	GMC	500	40	60	30
4.	GCWML	3000	200	165	75
5.	GCSL	600	135	200	60
6.	ICL	1100	200	150	150
7.	GCWNL	2327	125	170	R.R.
8.	GCWL	350	100	200	80
9.	ICWL	252	30	25	26
10.	GCBEL	350	20	130	30

APPENDIX (E)

LIBRARY STAFF

S. No.	NAME OF THE LIBRARY	TOTAL STAFF STRENGTH	PROFESSIONALS	NON-PROFESSIONALS
1.	SPCL	6	1	5
2.	ASCL	4	1	3
3.	GMC	4	2	2
4.	GCWML	6	2	4
5.	GCSL	4	1	3
6.	ICL	7	3	4
7.	GCWNL	9	4	5
8.	GCBL	5	1	4
9.	ICWL	4	2	2
10.	GCBEL	2	1	1

APPENDIX (F)

LIBRARIAN

S. NO.	NAME OF THE LIBRARY	LIBRARIAN'S QUALIFICATIONS	GRADE	STATUS
1.	SPCL	B.A, B.Lib. Sc.	475-850	Gazetted
2.	ASCL	M.A, B.Lib. Sc.	-do-	-do-
3.	GMC	B.Sc,B.Lib. Sc.	-do-	-
4.	GCWML	M.A, B.Lib. Sc.	450-700	Non-Gazetted
5.	GCSL	M.A, B.Lib. Sc.	-do-	-do-
6.	ICL	B.A, B.Lib. Sc.	475--850	Gazetted
7.	GCWNL	M.A, B.Lib. Sc.	-do-	-do-
8.	GCBL	M.A, B.Lib. Sc.	-do-	-do-
9.	ICWL	B.A, B.Lib. Sc.	450-700	Non-Gazetted
10.	GCBEL	B.A, B.Lib. Sc.	-do-	-do-

APPENDIX (G)

QUESTIONAIRE

Purpose = To survey college libraries.

Note
i) Attach a separate sheet wherever required.
ii) Please tick mark only wherever appropriate.

1. Name of the College.

2. Year of its establishment.

3. Year of establishment of its library.

4. Initial collection to start with ________________________

a) Books __________ b) Journals __________ c) Other documents ________________

5. Present collection ______________________

a) Books ________ b) Journals ____________ c) Other documents ________________

d) Number of journals being subscribed ____________________

e) Number of newspapers being subscribed ____________________

6. Approximate annual addition to the stock (at least for the last 3 years

1976-77 ______________ 1977-78 ______________ 1978-79 ______________

7. Name of the librarian ____________________

a) Qualifications ______________ b) Pay scale ______________

c) Status ____________________

8. Library staff strength:

a) Professionals __________ Semi-Professionals __________ Others __________

9. Approximate number of students ______________ and College staff ______________

10. Average number of daily visitors ____________________

11. Average number of daily issues ______________ and returns ______________

12. Method adopted for issue and return of books ______________

Browne's Newark Ledger Any other

13. Seating capacity in the library ____________________

14. Classification scheme used: DDC Ed CC Ed Any other Ed

15. Does the library possess catalogue ______________ for

a) Whole of the collection b) Partial collection __________

c) No catalogue

16. Catalogue codes used AACR/CCC/Any Other ______________

17. Book selection procedures.

18. Accesses to library collection: Open/Semi open/Closed ______________

19. Stock taking done Yes/No a) annually/irregularly

20. Does the library remain closed during stock taking ______________

21. Does the library staff compensate for the loss?

If so a) whole staff ______________ b) Only librarian

22. Procedure for lost documents to be compensated-Replacement latest price/Handling charges/ Nothing is charged.

23. Annual budget ______________ a) Recurring __________ b) Non recurring __________

24. Division of library finance on a) Books __________ b) Journals __________ and c) other items.

25. Reference service/Bibliographic service/Interlibrary loan services/Exchange services/Extension services/Photocopying/ Any other service ____________

26. Number of books issued to:

a) Students ______________ books for ____________ days

b) Teachers ______________ books for ____________ days

c) Other staff members _______books for ____________ days

27. On examination & other like duties fate of library staff ____________

28. Library timings ____________________

29. Periodicals on library science or librarianship subscribed/Not subscribed. If yes how many ___________________________

30. Library building Separate/Attached. Comments ______________

31. Does your library undergo cooperation? If so, of what kind ____________

32. Problems of faced in cooperating with other similar organisations ___________

33. Any hindrance in library development/service ___________________________

34. Your association with professional societies/Associations and professional activities __________________________

35. Brief history of your library
(Please supply any document giving information about your library, if available)

36. Your suggestions for efficient and effective working of your library

37. Write something (if you wish) as a college librarian about your experience, etc.

Signature of the Librarian

(Thanks for your cooperation)

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COUPLING OF COMPUTER PROCESSED INDEXES TO A PHOTOCOMPOSING UNIT TO IMPROVE THE READABILITY

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Presently available computer-assisted indexes and directories in India are reproduced on large scale by offset-printing the line printer output which is limited to all-upper-case format with a few important special symbols. In the case of indexes of research journals the text contains Greek symbols, super and subscripts, italic and bold types for which a number of improvisations are to be made (e.g. rendering a chemical formula linearly as in CACL2) while using a lineprinter output. This paper describes the details of a preliminary experimental project undertaken to explore the possibility of improving the readability of a computer assisted index (presently brought out by a line printer) by taking the output onto a paper tape in a compatible manner that can be fed to a film setter directly to provide lower-case letters and italic founts, with a flexibility of varying the point size.

INTRODUCTION

Computers have been pressed into service, during last two decades, to bring out a variety of indexes, directories and other useful listings in the field of information dissemination. Notable among them are the various services of Chemical Abstracts, Engineering Index, INSPEC services, etc. Starting with a modest all upper case line printer outputs of author and keyword indexes they have gone a long way to computerize even the production of primary journals like the Journal of the American Chemical Society with all sorts of typographical variations. Some computer-assisted indexes and directories have been brought out in India also by a few organizations concerned with scientific publications and information dissemination (1-8). Obviously, the computerization aims at i) relieving the drudgery of compiling them by mechanizing the alphabetization of the entries and attaching the titles to keywords repeatedly (in the case of KWOC type indexes); ii) obtaining them quickly on a line printer to offsetprint bulk copies; iii) having the facility of cumulating the data on auxiliary devices like magnetic tapes and discs, etc; and iv) using this store as data base by incorporating additional data, where necessary.

In the Publications & Information Directorate (PID), the KWOC indexes of CSIR research journals are being brought out by computer since 1976. The data are cumulated on magnetic tapes with a view to bringing out the cumulations at a suitable intervals. The keyword indexes of the Medicinal and Aromatic Plants Abstracts (MAPA), another service from PID, was also computerized since 1979. The keyword index brought out by means of a line printer is given alongwith every bimonthly issue of MAPA and is cumulated in the final issue (i.e. December issue) of the volume. The author index of MAPA given once in a year along with the December issue is also brought out by the computer. The data for both author and keyword indexes are retained on magnetic tapes for future cumulated indexes.

In the above-mentioned applications, the computer output is to be obtained with a good impression every time to get a good offset reproduction. Since the characters are produced by hammer impact on line printers, sometimes they are worn off which again impairs the reproduction. The text contains Greek letters, super- and subscripts, italic names, bold types to conform to some conventions, e.g. botanical names in italics, chemical symbols with upper and lower letter combination like Na, Cl. Of course, in the early applications many improvisations were effected by international computerised current awareness services using a 64-character line printer outputs in the interest of speedily bringing out these services.

Aim of the Paper

It is, therefore, thought worthwhile to explore the possibility of improving the readability of the MAPA computerized index by taking up a feasibility study of coupling the index output taken on to a paper tape (instead of a conventional line printer) to a film-setter unit (e.g. Monotype 400/8). In the following, the preliminary results of this project are reported.

PHOTOCOMPOSING :

The Monotype 400/8 filmsetter (FS) available at PID (being used for the bulk printing of research journals and allied publications) operates with an 8-channel paper tape using ASCII-7 codes. The paper tape input for the FS is prepared by trained operators using a 400 N/J keyboard wherein the data are punched in a continuous manner intermixed with a wide variety of machine commands. These commands include :

1) switching over to one fount from other say from Roman to, italics, bold, or Greek letters;
2) Providing and cancelling indents;
3) to left flush, right flush and centre the matter in a given line width;
4) to set the characters in any point size ranging from 5 pt to 24 pt size.
5) to indicate the column width say, in picas; and
6) to justify the matter according to a given column width.

For full details of these instructions, the reader is advised to consult the relevant manuals of the manufacturer.

The experimental project reported here, therefore, aimed at developing some programs whereby the MAPA index from a magnetic tape can be output onto a paper tape as if that was punched by an N/J operator for direct setting. If the index entries were to be set without computer processing, they are to be prepared manually and alphabetized before passing them on to the operator. The operator then will have to punch the entries incorporating the required machine codes like left flush, right flush, etc. Also reshuffling the data, cumulating and sorting of the data cannot be carried out by the manual method. Thus an attempt has been made to couple the processing capacity of a computer and the versatility of an FS for the purpose of improving the readability of not bulkier volume of indexes required for mass printing at regular intervals while cumulating the data on magnetic tapes for fast searching, etc, at a later date when required.

MAPA INDEX FORMAT AND PROCESSING

The MAPA keyword index entries are generated on magnetic tapes as a 132-byte records as shown in Fig 1 using ASCII-7 codes. The card design for generating the above file is shown in Fig 2. From Fig 2 it can be seen that the total length of the keyword and the context is limited to 70 bytes. But they are each generated as a 60 byte field on magnetic tape record (Fig 1). The records thus generated are sorted by the keyword, context, and the abstract identification number as successive control fields.

An output program prints out the final index from the sorted tape file by a line printer in a 4" width column consolidating the entries having common keywords and/or common context as shown in Fig 3 a.

TRANSITION TO PHOTOCOMPOSING

At this stage, a study has been made as to how this output is to be transferred to a PT in a compatible manner that can be fed to the FS 400/8. Naturally, a preliminary study was made as to how key punch operator does this job when the alphabetized entries are given to him. In the case of a computer processing, these are processed randomly and control information like the length of the keyword, context, etc. is generated along with the entries and the file is sorted into alphabetical order after which it is output by another program onto a line printer (see Figs 1 & 3). The switch over to the PT was carried out in a phased manner as explained below.

Phase 1:

In the first phase a few data records on magnetic tape (Fig 1) are just copied onto a paper tape on a Hewlett - Packard (HP) 21 MX computer supported by a paper tape reader (500 cps) and punch (75 cps) which uses ASCII-7 codes. This output was fed as it is into the FS supplying the control information like the point size, column width, etc. through the NJ/400 punching machine. This was accepted by the filmsetter since it is also based on ASCII-7 codes.

P3424

```
800203501114AMMI MAJUS                              IDENTIFICATION
8002060722 8ANTHELLMINTIC ACTIVITY                  EMBELLA
800204201916ANTIBIOTIC ACTIVITY                     SAMBUCUS EBULUS
800205601918BERBERIS CHILENSIS                      LIGNANS, ALKALOIDS
800203611720BUTEA MONOSPERMA                        FLOWER PHARMACOGNOSY
800203921510CANNABIS SATIVA                         CHEMOTYPES
800204421518ARDIAC ACTIVITY                         PANAX ROTOGINSENG
8002044120 9CARDIAC HEMODYNAMICS                    COMPOSITA
800204451426CARDIOTOXICITY                          CEPHALOTAXUS HARRINGTONIA
800203751011CARTHAMUS                               SCLERODERMA
800203741620CERVICAL EROSION                        EUPHOBIA NERTIFOLIA
800204251422CNS ACTIVITY                            ACACIA AURICULIFORMIS
800206131314CORIANDER OIL                           UNUSUAL SAMPLE
```

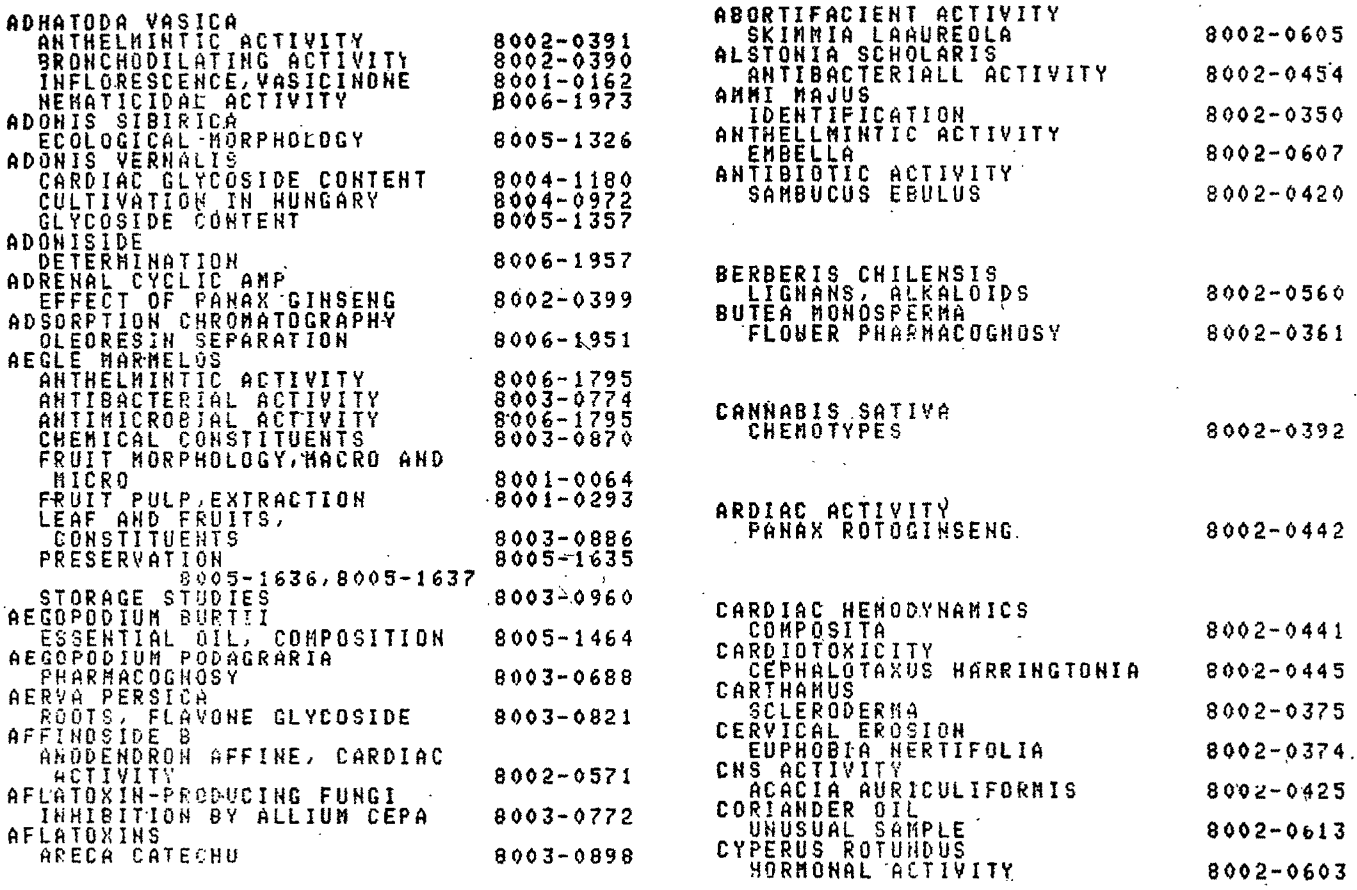
Fig. 1 - The format MAPA keyword index on magnetic tape (Bytes 1-2 : Year, 3-4 No; 5-8: Abst. No.; 9-10: Length of KW; 11-12 : Length of context; 13-72 : Keyword; 73-132 context).

Columns	Description
1-2	Year
3-4	No.
5-8	Abstract No.
9	1
10-80	Keyword followed by a slash followed by the context.

Fig.2 - The card design for generating the file in Fig.1.

Phase 2:

In the second phase the structuring of these entries onto PT with the FS codes as they appear in Fig 3 is studied i.e. the keyword in one line, the context in the next line with an indent of about 1/2 em (one em = $\frac{1}{6}$ ") and putting the abstract number (9 characters giving year , hyphen followed by the 4-digit abstract number). A simple case is reported here where a keyword and context are not more than one line which is mostly the case in MAPA index entries; its column width is 16 ems, and a width of 13 ems was used for accommodating keyword and the context (the context having an indent approx. of $\frac{1}{2}$ em) and 3 ems were used to represent the 9-character field of the identification number (IN) but treating the whole column width as 16 ems, the IN is right justified. Examining an entry in Fig.3 b , it can be seen that one has to punch the keyword "AMMI MAJUS" on paper tape followed by a "flush left code" of the filmsetter (say this code is decimal 11 or 0B hex) to left justify this entry and to go to the next line advancing the film feed. This should be followed by two fixed spaces (to give the indent for the context), the context, "IDENTIFICATION". In this line, this matter is to be left justified, and the IN, viz. 8002-0350 is to be right justified, suppressing the film feed so as to set this in one and the same line left justifying one portion and right justifying the other as required. Thus one need to know also the corresponding codes to cancel the line feed, right flush and that of a selected fixed space. Defining these codes absolutely in a computer program, the entry (Fig 3 b) is to be structur-

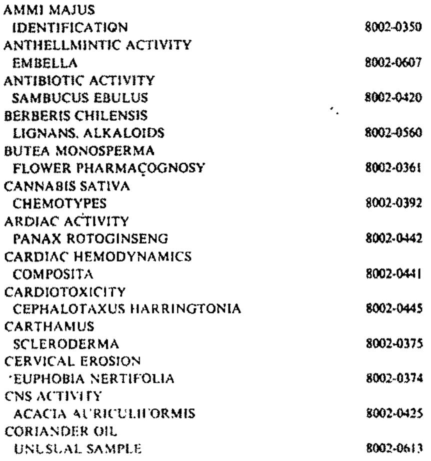


```
ADHATODA VASICA
  ANTHELMINTIC ACTIVITY               8002-0391
  BRONCHODILATING ACTIVITY            8002-0390
  INFLORESCENCE,VASICINONE            8001-0162
  NEMATICIDAL ACTIVITY                8006-1973
ADONIS SIBIRICA
  ECOLOGICAL-MORPHOLOGY               8005-1326
ADONIS VERNALIS
  CARDIAC GLYCOSIDE CONTENT           8004-1180
  CULTIVATION IN HUNGARY              8004-0972
  GLYCOSIDE CONTENT                   8005-1357
ADONISIDE
  DETERMINATION                       8006-1957
ADRENAL CYCLIC AMP
  EFFECT OF PANAX GINSENG             8002-0399
ADSORPTION CHROMATOGRAPHY
  OLEORESIN SEPARATION                8006-1951
AEGLE MARMELOS
  ANTHELMINTIC ACTIVITY               8006-1795
  ANTIBACTERIAL ACTIVITY              8003-0774
  ANTIMICROBIAL ACTIVITY              8006-1795
  CHEMICAL CONSTITUENTS               8003-0870
  FRUIT MORPHOLOGY,MACRO AND
   MICRO                              8001-0064
  FRUIT PULP,EXTRACTION               8001-0293
  LEAF AND FRUITS,
   CONSTITUENTS                       8003-0886
  PRESERVATION                        8005-1635
          8005-1636,8005-1637
  STORAGE STUDIES                     8003-0960
AEGOPODIUM BURTII
  ESSENTIAL OIL, COMPOSITION          8005-1464
AEGOPODIUM PODAGRARIA
  PHARMACOGNOSY                       8003-0688
AERVA PERSICA
  ROOTS, FLAVONE GLYCOSIDE            8003-0821
AFFINOSIDE B
  ANODENDRON AFFINE, CARDIAC
   ACTIVITY                           8002-0571
AFLATOXIN-PRODUCING FUNGI
  INHIBITION BY ALLIUM CEPA           8003-0772
AFLATOXINS
  ARECA CATECHU                       8003-0898
```

```
ABORTIFACIENT ACTIVITY
  SKIMMIA LAAUREOLA                   8002-0605
ALSTONIA SCHOLARIS
  ANTIBACTERIALL ACTIVITY             8002-0454
AMMI MAJUS
  IDENTIFICATION                      8002-0350
ANTHELLMINTIC ACTIVITY
  EMBELLA                             8002-0607
ANTIBIOTIC ACTIVITY
  SAMBUCUS EBULUS                     8002-0420


BERBERIS CHILENSIS
  LIGNANS, ALKALOIDS                  8002-0560
BUTEA MONOSPERMA
  FLOWER PHARMACOGNOSY                8002-0361


CANNABIS SATIVA
  CHEMOTYPES                          8002-0392


ARDIAC ACTIVITY
  PANAX ROTOGINSENG                   8002-0442


CARDIAC HEMODYNAMICS
  COMPOSITA                           8002-0441
CARDIOTOXICITY
  CEPHALOTAXUS HARRINGTONIA           8002-0445
CARTHAMUS
  SCLERODERMA                         8002-0375
CERVICAL EROSION
  EUPHOBIA NERTIFOLIA                 8002-0374
CNS ACTIVITY
  ACACIA AURICULIFORMIS               8002-0425
CORIANDER OIL
  UNUSUAL SAMPLE                      8002-0613
CYPERUS ROTUNDUS
  HORMONAL ACTIVITY                   8002-0603
```

Fig.3 - Sample of MAPA index obtained on a line printer.

ed by moving the appropriate codes as described above and then output this record on to a PT. Just as in the case of a line-printer output, the program has to take care of consolidating the common entries under one keyword and consolidating the INs in the case of entries having both keyword and context identical. A Fortran-IV program (Program I) to generate such a paper tape output was developed and Fig 4 shows a sample of the filmsetter output, which contains, like the original line-printer output the structured output of the index in all capital letters set in 6 pt roman type with 16 em column width.For limited volume of data, it is felt that this may be used to get good reproduceable output for bulk copies overcoming the difficulties encountered with a line-printer output described earlier in this paper. Once the above program is finalized, it can be used to output hundreds of entries in a manner punched out manually by an operator many times faster and accurate as these codes are incorporated automatically by the computer.

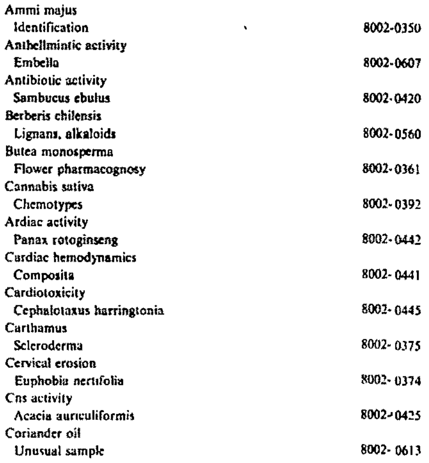


```
AMMI MAJUS
 IDENTIFICATION                       8002-0350
ANTHELLMINTIC ACTIVITY
 EMBELLA                              8002-0607
ANTIBIOTIC ACTIVITY
 SAMBUCUS EBULUS                      8002-0420
BERBERIS CHILENSIS
 LIGNANS, ALKALOIDS                   8002-0560
BUTEA MONOSPERMA
 FLOWER PHARMAÇOGNOSY                 8002-0361
CANNABIS SATIVA
 CHEMOTYPES                           8002-0392
ARDIAC ACTIVITY
 PANAX ROTOGINSENG                    8002-0442
CARDIAC HEMODYNAMICS
 COMPOSITA                            8002-0441
CARDIOTOXICITY
 CEPHALOTAXUS HARRINGTONIA            8002-0445
CARTHAMUS
 SCLERODERMA                          8002-0375
CERVICAL EROSION
 EUPHOBIA NERTIFOLIA                  8002-0374
CNS ACTIVITY
 ACACIA AURICULIFORMIS                8002-0425
CORIANDER OIL
 UNUSUAL SAMPLE                       8002-0613
```

Fig.4 - Sample of the index given in Fig.3 when output by the filmsetter.

Phase 3 :

In the next phase, an attempt has been made to further improve the readability of the output by changing the text into lower case letters, by modifying the Program I and keeping it as an option - supplied through control information at the beginning of the program. To begin with, the first letter of the keyword and the context were retained as upper case letters and the rest were converted uniformly to lower case, except of course the special symbols and the blank character. The PT output thus obtained was fed to the FS and Fig 5 shows the result. It can be seen, from a comparison of Fig.4 and Fig.5, that the entry "Cns Activity" is not elegant as "Cns" looks like a word and thus not giving the full meaning that it is used as an abbreviation, whereas in Fig 4, it can be taken for granted in all upper case letter format.



Ammi majus	
Identification	8002-0350
Anthellmintic activity	
Embella	8002-0607
Antibiotic activity	
Sambucus ebulus	8002-0420
Berberis chilensis	
Lignans, alkaloids	8002-0560
Butea monosperma	
Flower pharmacognosy	8002-0361
Cannabis sativa	
Chemotypes	8002-0392
Ardiac activity	
Panax rotoginseng	8002-0442
Cardiac hemodynamics	
Composita	8002-0441
Cardiotoxicity	
Cephalotaxus harringtonia	8002-0445
Carthamus	
Scleroderma	8002-0375
Cervical erosion	
Euphobia nertifolia	8002-0374
Cns activity	
Acacia auriculiformis	8002-0425
Coriander oil	
Unusual sample	8002-0613

Fig.5 - Sample of index shown in Fig.4 after conversion to lower case letters.

To improve this situation, additional coding is incorporated in the input preparation A symbol ("@" is chosen here) may be used before the letter that should appear as a capital except in the case of first letter of a keyword or context. Programme I is again modified so that it recognizes the letters not/ to be converted into the corresponding lower case letters. As pointed out earlier normally the operator punching the text on PT for filmsetting can give commands to switch over chosen parts from Roman to italics, bold type, can set Greek letters, super and subscripts. In this project where limited computer processed data files were used to improve readability of the output, one more variation was tried to obtain italic fount when required.

Using the same MAPA keyword entries file, the following code was designed to get the output containing the upper and lower case letters with italics type where desired (Fig 6). As explained above, '@' sign is used to retain a capital letter. Thus the abbreviation in the example, "CNS ACTIVITY" is coded as "C @ N @ S ACTIVITY". In col. 9 (see Fig 2) digit '1' is coded to indicate that it should be in Roman fount and '2' to indicate that it should be in italics. In the context, the portion to be rendered in italics is enclosed within $ signs one at the beginning and one at the end (see Fig 6). Program I was again modified to include the absolute codes of calling the fount 1 (Roman) and fount 2 (italics) when necessary by means of the coding discussed above. Also the code in col.9 of the coding sheet is transfered to the 60th character in the keyword field in the tape format of input file (Fig 7) to enable the output program to incorporate the necessary machine codes in the case of an italic keyword.

The positions 41-59 in the keyword field (having a total 60 characters) are filled with the portion of keyword starting from character 1 onwards, stripping the '@' if any (Fig 7). This is done with a view to using this portion as the control field for sorting the keyword. The total effective characters of the keyword are thus reduced to 39 in this case. The total field of 60 characters can be increased if it is felt that keywords with more characters are to be used in some other applications. The same procedure is repeated for the context by filling the 41-60 positions of context taking characters from position 1 onwards stripping of '@' and '$' signs to serve as the second control field for sorting. (The examples shown in this paper are taken mostly from random entries rather than a sorted file).

The PT output from this modified program when fed to the FS gave the output as shown in Fig 8.

CONCLUDING REMARKS

The preliminary results of the project described here showed that the readability of the computer printed indexes, and other listings can be improved by taking the output on a paper tape and feeding it to a filmsetter in a compatible manner containing the machine codes of the particular filmsetter. The data can be cumulated on magnetic tape to enable them to be sorted, merged and searched at a fast rate while the periodical outputs can be outputted to the slow speed paper tape medium to be fed to the film setter in the interest of improving

```
800203502AMMI MAJUS /IDENTIFICATION
800206071ANTHELLMINTIC ACTIVITY/$@EMBELLA$
800204201ANTIBIOTIC ACTIVITY/$@SAMBUCUS EBULUS$
800205602BERBERIS CHILENSIS /LIGNANS, ALKALOIDS
800203612BUTEA MONOSPERMA /FLOWER PHARMACOGNOSY
800203922CANNABIS SATIVA/CHEMOTYPES
800204421ARDIAC ACTIVITY/$PANAX ROTOGINSENG$
800204411CARDIAC HEMODYNAMICS/COMPOSITA
800204451CARDIOTOXICITY/$@CEPHALOTAXUS HARRINGTONIA$
800203752CARTHAMUS /SCLERODERMA
800203741CERVICAL EROSION/$@EUPHOBIA NERTIFOLIA$
800204251C@N@S ACTIVITY/$@ACACIA AURICULIFORMIS$
800206131CORIANDER OIL/UNUSUAL SAMPLE
```

Fig.6 - Sample of the extra coding modifying the design given in Fig.2.

```
 0003  800203501114AMMI MAJUS                AMMI MAJUS          2IDENTIFICATION                  IDENTIFICATIO-
N
 0004  800206072210ANTHELLMINTIC ACTIVITY    ANTHELLMINTIC ACTIV1$@EMBELLA$                    EMBELLA
 0005  800204201918ANTIBIOTIC ACTIVITY       ANTIBIOTIC ACTIVITY1$@SAMBUCUS EBULUS$            SAMBUCUS EBUL
US
 0006  800205601918BERBERIS CHILENSIS        BERBERIS CHILENSIS 2LIGNANS, ALKALOIDS            LIGNANS, ALKA
LOIDS
 0007  800203611720BUTEA MONOSPERMA          BUTEA MONOSPERMA   2FLOWER PHARMACOGNOSY          FLOWER PHARMA
COGNOSY
 0008  800203921510CANNABIS SATIVA           CANNABIS SATIVA    2CHEMOTYPES                    CHEMOTYPES
 0009  800204421519ARDIAC ACTIVITY           ARDIAC ACTIVITY    1$PANAX ROTOGINSENG$           PANAX ROTOGIN
SENG
 0010  8002044120 9CARDIAC HEMODYNAMICS      CARDIAC HEMODYNAMICICOMPOSITA                     COMPOSITA
 0011  800204451428CARDIOTOXICITY            CARDIOTOXICITY     1$@CEPHALOTAXUS HARRINGTONIA$  CEPHALOTAXUS
HARRING
 0012  800203751011CARTHAMUS                 CARTHAMUS          2SCLERODERMA                   SCLERODERMA
 0013  800203741622CERVICAL EROSION          CERVICAL EROSION   1$@EUPHOBIA NERTIFOLIA$        EUPHOBIA NERT
IFOLIA
 0014  800204251424C@N@S ACTIVITY            CNS ACTIVITY       1$@ACACIA AURICULIFORMIS$      ACACIA AURICU
LIFORMI
 0015  800206131314CORIANDER OIL             CORIANDER OI'      1UNUSUAL SAMPLE                UNUSUAL SAMPL
E
```

Fig.7 - Modified tape format given in Fig.1 after incorporating the extra coding.

Ammi majus	
Identification	8002-0350
Anthellmintic activity	
Embella	8002-0607
Antibiotic activity	
Sambucus ebulus	8002-0420
Berberis chilensis	
LignansL alkaloids	8002-0560
Butea monosperma	
Flower pharmacognosy	8002-0361
Cannabis sativa	
Chemotypes	8002-0392
Ardiac activity	
panax rotoginseng	8002-0442
Cardiac hemodynamics	
Composita	8002-0441
Cardiotoxicity	
Cephalotaxus harringtonia	8002-0445
Carthamus	
Scleroderma	8002-0375
Cervical erosion	
Euphobia nertifolia	8002-0374
CNS activity	
Acacia auriculiformis	8002-0425
Coriander oil	
Unusual sample	8002-0613

Fig.8 - Sample output of the filmsetter giving typographical variations.

the readability of the hard copy required to be printed on a large scale. This project was taken up with a filmsetter taking the input through a paper tape medium. But the speed of outputting the index entries can be increased by taking it onto a floppy disc and feeding it to a FS which can accept the floppy disc input though the filmsetting speeds depend on a particular type of equipment.

By introducing more coding in the data and modifying the Program I, the typographical variations like switching over to Greek letters, superscripts, subscripts and bold letters can also be obtained. This work is in progress using bigger size records of the presently computerized PID journals' index files where the titles run from 50 to 300 characters.

ACKNOWLEDGEMENTS :

The author is grateful to Shri Y.R . Chadha, Chief Editor and Shri R.N. Sharma, Assistant Director, PID for giving me encouragement and facilities to take up this work and for giving permission to publish this paper. His thanks are also due to Mr. P.N. Menon and his colleagues in the Photocomposing Unit, PID for their cooperation in obtaining the filmsetter output and Dr.P.S.Tyagi and Mr.S.Kailash, Computer Centre, Biophysics Division, All India Institute of Medical Sciences, for helpful discussions.

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INFORMATION CENTRE'S ROLE IN TRANSFERRING SPECIAL STEELS TECHNOLOGY

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Describes how the Information Centre of the Special Steels Plant helps the engineers/ technologists/planners/ R & D personnel, etc. of the plant. With the view that timely information can check wastage and improve production and quality, the Centre arranges to obtain when necessary, the relevant information in advance directly from the sources.

INTRODUCTION

There is a common belief that the art of iron making came to India from abroad, probably from West Asia. Once the Indians had acquired the knowledge of the process, iron technology in India received real impetus around 1000 BC and Indian irons came to be classed as the best in the world. The Iron Pillar of Delhi, the beams in the Sun Temple at Konarak and the Cannon at the Tanjore Fort are living monuments of the advanced iron technology that prevailed in India in olden days. The great pillar of Delhi is a glowing tribute to the technological advancement made in olden days in the field of iron extraction, fabrication and in developing the corrosion resistance property of iron.

In India alloy steels are being produced on a small scale for over three decades at the ordnance factories - at an integrated steel plant during the second World War and currently at some small electric furnace plants. Since the production of special steels in greater quantities was considered essential, Government of India proposed to enter into an agreement with a foreign producer of special steels. The production of variety of high quality and high cost items at the special steels plant requires a different concept and approach from that of an integrated plant producing plain carbon steels in million tonnes. Government of India after careful consideration accepted the offer of Atlas Steels Ltd., Canada for importing their technical know-how and co-operation for manufacturing special steels in India. The contracts for the supply of equipment for the proposed plant were, however, awarded to a Japanese Consortium.

TECHNICAL KNOW-HOW

Since India had to depend on foreign countries for technical knowledge regarding installation and operation of a special steel plant,transfer of technologies from those countries were, therefore, needed. The factors influencing the diffusion of technology from one country to another, from one person to another within a group of specialists are all dependent on the availability and access to information. Technology transfer, in most cases, means transfer of information for required production and technological improvements. The special steels plant, was originally planned to produce alloy and special grade steels of wide varieties through conventional electric arc furnace process. Subsequently to meet the stringent defence requirements degassing of certain grades were considered necessary. Hence Rheinstahl Huttenwerke (R H) vacuum degassing technique for the removal of dissolved hydrogen from steel was adopted.

Recent modifications have made it possible to carry out vacuum refinement by making provision for oxygen lancing and alloy additions in the vessel. An expert team visited Europe and after observing various plants decided to adopt the RH technique of M/S Standard Messo, Duisberg, Federal Republic of Germany. This technique of oxygen lancing under vacuum permits the utilization of low cost high carbon ferro-alloys instead of the high cost low-carbon or extra-low-carbon ferro-alloys. On the basis of the existing product mix and the output of stainless steel alone the amount of Rs. 90 lacks could be saved. Advance assessment was done and the need of technical know-how in this field of technology was felt, accordingly planning was made. With the view that timely information can check wastages and improve production and quality the Centre contacted in advance the foreign consultants like,

1) M/S Standard Messo,
2) M/S ASEA SKF,
3) VAC Metal.

All their catalogues, specifications, drawings, flowcharts and other necessary paper particulars were obtained. In some cases advance foreign payments were to be arranged.

In addition, primary documents on vacuum degassing were obtained from Metals Society, London, American Society for Metals, USA and Canadian Institute of Metallurgy, Quebec. On receipt of the documents the Centre analysed those keeping in view the main requirements. These were then brought to the notice of "Planning & Engineering Department" who were the Chief Coordinator for introduction of any new technology. Technologists and engineers of the production department who were to adopt the technology were also kept informed. All the paper particulars and documents were thoroughly analysed, classified and catalogued. This advance information helped the organization in planning the foreign visit of the technologists/engineers.

The most remarkable achievement of Research & Development Wing is the development of a new type of stainless steel called "Deepon" for utensils industries. Nickel is one of the costliest and scarce metals in India. This steel contains much less nickel than the conventional grades having 18% chromium and 9% nickel. The new product will help us in conserving nickel as well as saving foreign exchange.

Before undertaking the project the Centre was requested to make literature survey. The Centre took the advantage of the "Seminar on Access to Bibliographic Data Bases" held at Bombay in September 1976 for searching out references through RECON on-line demonstration project linking the world sources of information. Immediately some references could be obtained. A few documents were already available at this end. For others the Metals Society London, British Library Lending Division, British Industrial & Scientific International Translation Service (BISITS), American Society for Metals, Iron & Steel Institute of Japan were contacted. In this way we could save considerable amount of time and money.

The Research & Development Wing is working with the project for the production of nickel free austenitic stainless steel i.e. substituting manganese for nickel. The Information Centre is constantly remaining associated with this project. This might lead to import substitution if the project can be completed successfully by large scale trial. Lot of foreign exchange can be saved by importing lesser quantity of nickel.

In these projects and developmental work the Information Centre was/is coordinated for necessary assistance. The Centre helps the plant technologists, engineers and the R & D personnel through literature search, by making abstracts, providing current awareness and SDI services, and by arranging quick procurement of required documents.

HOW TECHNOLOGIES WERE IMPORTED

i) Indian engineers were initially working hand in hand with the foreign technicians /engineers.

ii) Indian personnel were trained in different plants and works within and outside India

iii) Exhaustive drawings, layouts, charts, flow copies, standards & specifications, and literature were procured from various sources.

iv) In case of any problem opinion of the foreign experts were/are sought. The Director of the Atlas Steel Ltd. is visiting the plant very often to help solve problem.

INFORMATION CENTRE

Information centres and information analysis centres are vital for efficient transfer of complex technologies from the sources/ producers to the users. With this view in mind establishment of a special library and information centre was considered essential. The Centre from the very beginning is catering to the needs of its clientele by procuring (importing when necessary) the relevant technical information, analysing and disseminating those to respective users. An aggresive acquisition policy is practiced to obtain almost all publications of interest, sometimes in anticipation, direct from the sources.

Naturally the Centre is constantly in touch with almost all foreign and Indian production and research units of special steels. Considering that effective and quick transfer of technological information is possible by becoming member of foreign and Indian associations, institutes, societies, standards organizations, etc., the Centre is trying to keep direct contact with most of such organizations as are making, shaping and treating steels. The author himself is a member of many such associations, institutes, etc.

DISSEMINATION OF INFORMATION

On receipt of specific technological information the Centre is analysing and disseminating those through SDI, current awareness, abstracting & title index services. Cataloguing and indexing are also done by the library wing for proper storage. Conferences, seminars, technical meetings and lectures through technical forum are also arranged periodically by the centre. Engineers and technicians are to exchange their views through discussions and by delivering lectures about their experience of visits in foreign firms and works. They are also to suggest means of improvement and implementation of their gathered knowledge in the respective fields of our interest.

CONCLUSION

Liberalization of import of technology and technical literature for developing and underdeveloped countries is essential. These countries should also side by side try to innovate their own technology. Research and Developmental work on product and process technologies should be given priority.

Direct contact with the sources is always the best means of getting technological information transferred quickly, effectively and at competitive costs. Keeping this in mind information centres should try to become member of as many learned societities as possible. Costs for getting information for members are much less than others. In some cases even 45% reduction in price is offered. As a member, relevant information can be obtained almost immediately. This eliminates long delay of getting information through agent.

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ORGANISATION OF REPORT LITERATURE IN A TECHNICAL LIBRARY HAVING MODERATE COLLECTIONS: A CASE STUDY

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A case study of the shelf arrangement of technical reports according to accession number in a scientific library having moderate collections, has been presented.

Over the years report literature has come to constitute a section of the literature ranking in importance with journals, books, patents and standard specifications (1) specially in the field of astronautics and aeronautics. A study by the present authors has revealed that the reports are being cited in more numbers (2).

SHAR Centre Library and Documentation Section has been entrusted with the responsibility of collecting, collating and disseminating information to scientists/engineers working in the field of flight operations of launch vehicles, telemetry, tracking and command, data processing, static tests of space segments, propellants, booster developments, orbital dynamics, sounding rocket programmes, etc.

In the process of acquisition in the above specialised subject fields, the Library has been procuring a number of reports from various institutions, societies, and organisations, e.g. NASA, AFOSR, SAMSO, AIAA, RAE, ESRO, etc., through NTIS and other sources in hard copy form, mostly photocopies or sometimes in original printed forms. Because the report numbering systems used by originating, sponsoring, and distributing agencies may differ, this, at times, results in the assignment of multiple report designations for the same report (3). Most of the reports actually will have on the title page several numbers, like printed numbers, stamped or handwritten numbers, some have inexplicable combinations of letters and numbers decorating all edges. An example of this type encountered in the SHAR Library is given in Annexure-I.

These multiple numbers create endless confusion to those handling the reports for retrieval, shelving, etc. Our experience is that these reports can be sought through any one of these numbers, e.g. NASA-CR- / SAMSO-TR- /N- /AD- /JPL- / etc. or any other number that may be present on the report.

EARLIER PRACTICE OF ARRANGEMENT

Reports were used to be shelved according to the sequence of report originator number which is in alphanumeric form. Some of the reports which have been supplied by NTIS have either AD, N or other numbers without originator numbers on the reports. Such reports were used to be arranged according to the sequence of the alphanumeric form.

Since the pattern of assigning report numbers by the originator, sponsoring body, receiving agency are published and received in the Library, it has been observed that arrangement has often to be disturbed to facilitate shelving of incoming reports and the problem becomes more acute if pamphlet boxes, lateral files or filing cabinets are used. The library staff find it difficult to store and retrieve the information. The user too finds it most inconvenient to locate and select the required report.

PRESENT METHOD OF ARRANGEMENT

In order to adopt a simplified method it has been decided to arrange such documents including reprints as per their accession numbers.

For this purpose all the report literature, reprints, etc. are being entered in a separate accession register meant for report literature. Each accession number will be preceded with the letter "R" denoting Report Literature.

With this arrangement it has been possible to retrieve and reshelve the documents quickly. It also facilitates placing the new additions easily.

Multiple cross references have been provided in the catalogue so that the reader gets the document approaching through any of the numbers that might have been given on the report, For the report shown in the Appendix I, the following entries have been prepared.

Main Entry : SAMSO-TR-68-478
MAYER (S W) etc.
Techniques for Controlling
Exothermic Decomposition of
Ammonium Perchlorate
N69-20559
AD 680770
R 1548 AEROSPACE-TR-0200
(4210-10)

Other added entries have been provided for:

Author/s,
Title
Subject Index, Uniterm, using
NASA Thesaurus

In addition to the above entries, the following cross reference entries for multiple report numbers have been provided to meet the query of the readers.

i) AD 680770
See
SAMSO-TR-68-478
R 1548

ii) N69-20559
See
SAMSO-TR-68-478
R 1548

iii) AEROSPACE TR-0200 (4210-10)-2
See
SAMSO-TR-68-478
R 1548

This proves to be very useful in our Library both for retrieval and for checking the already available reports prior to processing fresh suggestions for acquiring reports. From our experience, it has been observed that indentors approach through any one of the numbers mentioned on the cover page.

On each entry our report accession number (i.e. R 1548) has been incorporated in order to facilitate quick retrieval of the report from the stack.

It is a well-known fact that most of the reports are not arranged according to subject classification, as they are not usually classified using the conventional classification systems. In most of the leading libraries in India, they are arranged according to the report originating source number. This also is not a subject wise arrangement. In order to simplify retrieval and shelving of reports and also to save the time of the reader as well as of library staff, arrangement according to accession number has been started. Its advantages and disadvantages are yet to be seen and studied. Hence, comments are most welcome especially from those who might have tried this method.

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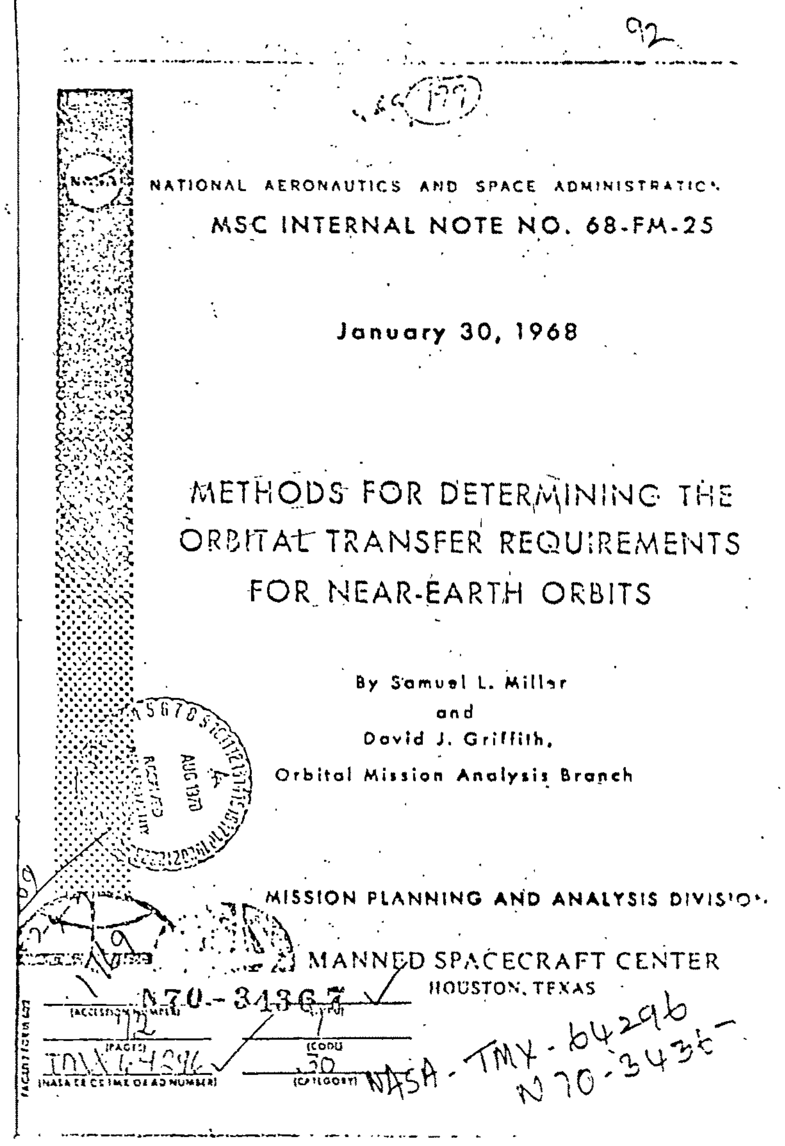

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MSC INTERNAL NOTE NO. 68-FM-25

January 30, 1968

METHODS FOR DETERMINING THE
ORBITAL TRANSFER REQUIREMENTS
FOR NEAR-EARTH ORBITS

By Samuel L. Miller
and
David J. Griffith,
Orbital Mission Analysis Branch

AUG 1970
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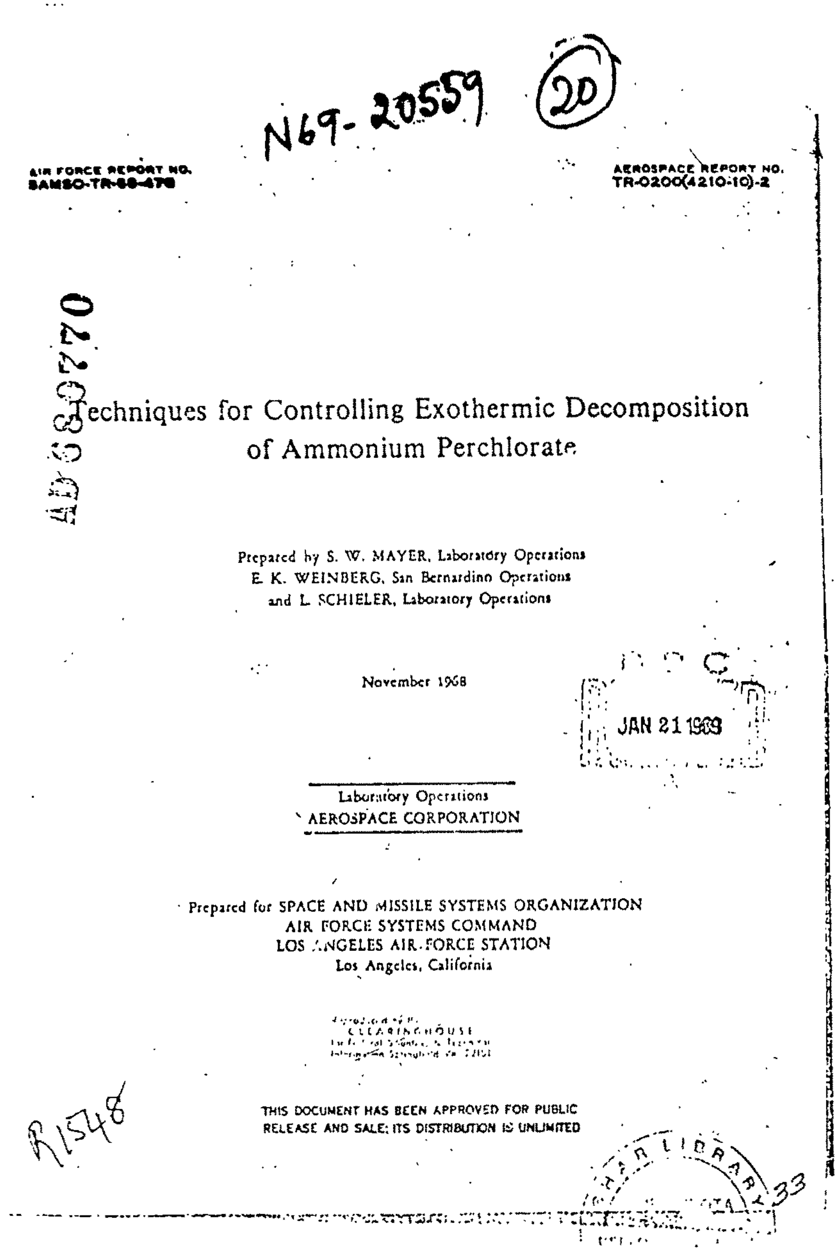
MISSION PLANNING AND ANALYSIS DIVISION

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

N70-34367 (ACCESSION NUMBER)	1 (THRU)
72 (PAGES)	(CODE)
TMX-64296 (NASA CR OR TMX OR AD NUMBER)	30 (CATEGORY)

FACILITY FORM 602

NASA-TMX-64296
N70-3436



N69-20559 (20)

AIR FORCE REPORT NO.
SAMSO-TR-68-476

AEROSPACE REPORT NO.
TR-0200(4210-10)-2

AD 680270

Techniques for Controlling Exothermic Decomposition
of Ammonium Perchlorate

Prepared by S. W. MAYER, Laboratory Operations
E. K. WEINBERG, San Bernardino Operations
and L. SCHIELER, Laboratory Operations

November 1968

D D C
JAN 21 1969

Laboratory Operations
AEROSPACE CORPORATION

Prepared for SPACE AND MISSILE SYSTEMS ORGANIZATION
AIR FORCE SYSTEMS COMMAND
LOS ANGELES AIR FORCE STATION
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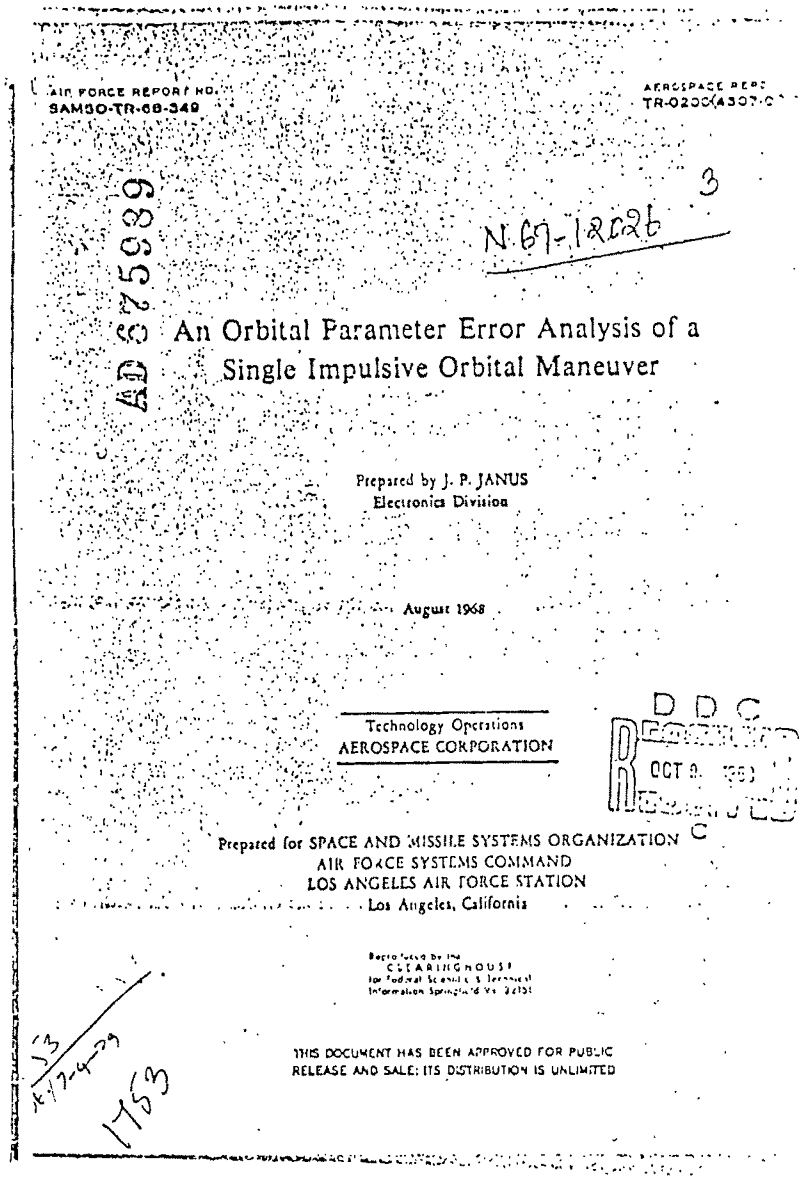

AIR FORCE REPORT NO.
SAMSO-TR-68-349

AEROSPACE REPT
TR-0200(4307-C

AD 675039

N 67-12026 3

An Orbital Parameter Error Analysis of a Single Impulsive Orbital Maneuver

Prepared by J. P. JANUS
Electronics Division

August 1968

Technology Operations
AEROSPACE CORPORATION

D D C
OCT 9

Prepared for SPACE AND MISSILE SYSTEMS ORGANIZATION
AIR FORCE SYSTEMS COMMAND
LOS ANGELES AIR FORCE STATION
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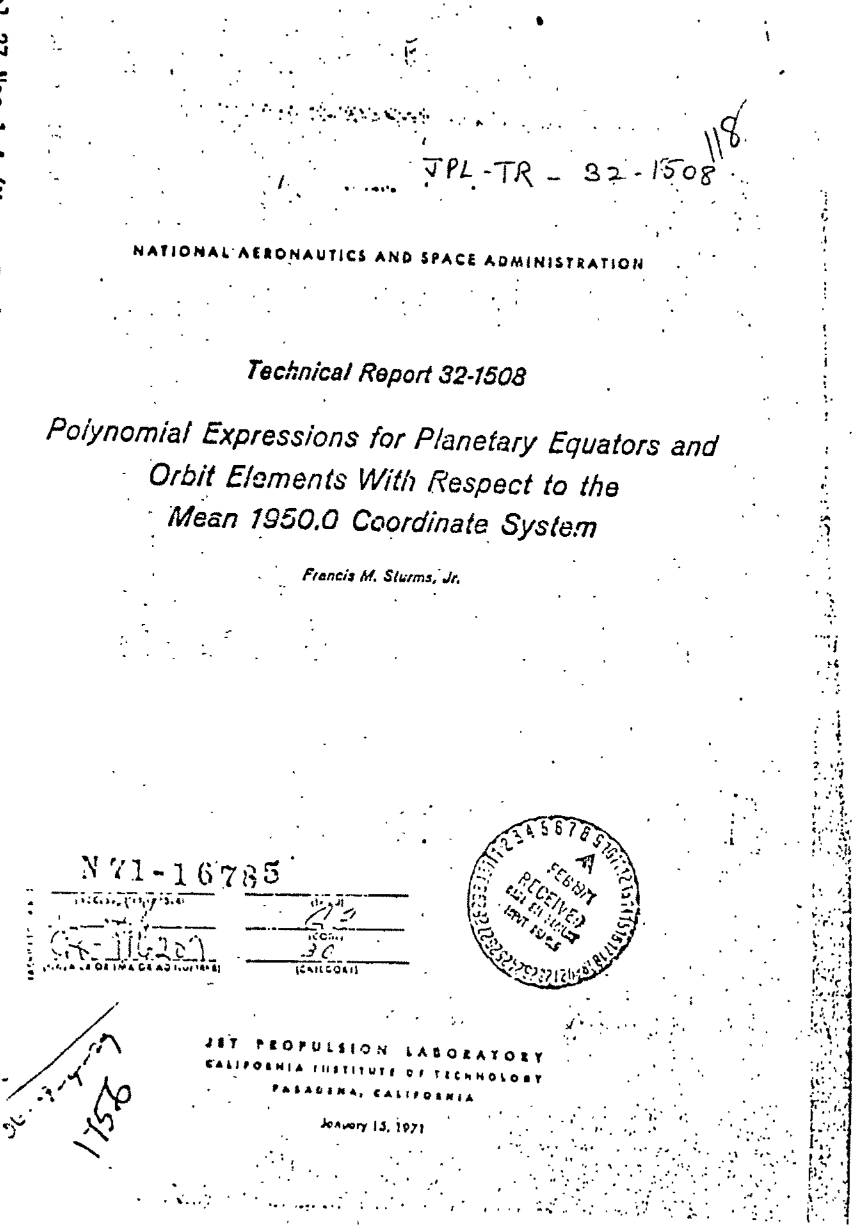

JPL-TR - 32-1508 118

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Report 32-1508

Polynomial Expressions for Planetary Equators and Orbit Elements With Respect to the Mean 1950.0 Coordinate System

Francis M. Sturms, Jr.

N71-16785

CR-116281
(NASA CR OR TMX OR AD NUMBER)

22
(CODE)

30
(CATEGORY)

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FEB 1971

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

January 15, 1971

26-4-79
1756

Annals of Library Science and Documentation
1980, 27(1-4), 34-40.

ROLE OF AN AGRICULTURAL UNIVERSITY LIBRARY IN TECHNOLOGY TRANSFER IN AGRICULTURE

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University Library
Punjabrao Krishi Vidyapeeth
Akola-444104
Maharashtra

Indian agricultural universities have made a great contribution in the fields of agricultural education, research and extension and have justified the investment of public funds on them as they have solved the problem of food and hunger to a considerable extent by undertaking the extensive research programmes and adopting modern technology for increasing agricultural production and transforming rural life by way of transfer of technology. In order to sustain and further accelerate their pace of research and development it is necessary to ensure central and state support for sound development of agricultural university libraries which are the treasure houses of information resources. A 'Network of Agriculture Information System' at national, international and regional level should be established in collaboration with agricultural university libraries and I.C.A.R Institute libraries for effective transfer of technology in agriculture.

1. INTRODUCTION

Agricultural education, research, and extension are three of the essential services that an agricultural university must provide for a country's agricultural development. Research evolves new ideas and new techniques, extension assists farm people to put into practice the products of research and education provides trained personnel for all agricultural development, including research and extension. The three services constitute the framework in which the university effort, including I.C.A.R. technical assistance, can work to benefit the farming community. Whether such effort is utilised in the most effective and economic way depends on the organization and administration of these services, which are closely interrelated.

In India agricultural education is on the threshhold of a new era. This new era defines the parameters in which university libraries are to function for the foreseeable future. A very serious concern for those libraries that serve the major research oriented universities is the continuance of their capacities to provide adequate information resources for academic research.

Need for bibliographic control of doctoral and post-doctoral research potential is being felt more and more. As expansion of agricultural education goes forward following economic improvement and as science, technology and trade develop in the same way the quantity of research work also increases every year. Interdisciplinary overlapping has opened up new fields of research. In view of this situation, it is necessary that the researcher knows what has already been done in his field of research. He should know what type of data have already been collected and what theories, based on that data, have been propounded. Transfer of research results from laboratories to fields through library will keep alive the hopes of the nation.

2. OBJECTIVES

Today, the food-producing countries are being asked to share their abundance with the millions of hungry people in the world. Factors vital to the future of the world food supply include the less costly farm machinery, development of indigenous farm machinery for less developed countries, development of alternative sources of energy, increased input into basic research, improvements in more and better high-

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The paper was presented at the All India ICAR Seminar, held at Hyderabad in December 1980.

yielding crop strains, more effective land use, a world-wide agricultural meteorological network, and a world food reserve system. These represent only a sample of the many basic challenges facing the world agricultural community.

There is a growing consensus that food may be one of the most complex economic, political, and moral issues of our time. In this regard, agricultural librarians, documentalists, and information specialists have a vital role to play in providing timely and relevant information services to farmers, livestock producers, agricultural business organizations, research workers, subject specialists, teachers, students, and others who are actively engaged in meeting the continuing challenge of man, food and hunger.

I would like to suggest a few critical turning points for agriculture awaiting us in the years ahead. Our capability to increase crop yield is one of our major concerns. We have to get off the plateau that is holding back agricultural production rates. To do that will require integration and use of information in such ways as have not been done before. Secondly, agriculture of the future will have a priority directed towards elimination of contaminants in food products, resulting in new information demand. Thirdly, the genetics of crops and livestock will have vastly increased information needs to produce better crops and animals. Future needs for information will be enormous as we improve and develop new techniques to save and restore our resources. Our immediate task is that we must think of tomorrow. We must work out the technology today for the newly restructured technical information system in science, education and administration to make sure that it meets our needs for the future. All of us in agriculture will be relying as before on computer technology as a vital and crucial aid for information processing that will allow us to connect all those concerned with creative decision making in agriculture. Our objective is to improve our knowledge about the agricultural information and the utilisation thereof. The agricultural university libraries in collaboration with ICAR Institutes should form a network of library and information system under the guidance of Indian Council of Agricultural Research.

3. LIBRARY DEVELOPMENT FOR EFFECTIVE ROLES AND FUNCTIONS

National Education Commission (1964) in its report recommended the establishment of at least one agricultural university in each state of India. National Commission on Agriculture (1976) recommended implementation of various developmental plans for establishing new agricultural complexes, I.C.A.R. institutes and projects in collaboration with the agricultural universities in India. This has opened avenues for the establishment of modern, well developed and well organised university libraries on scientific basis in order to play a vital constructive role in the nation building task of agricultural education, research and extension. Communication of new information and technology to the agricultural scientists is the main task of university libraries in India. A modern, well-developed and well-equipped university library plays a vital role in the process of information transfer to agricultural scientists.

Recent developments in agriculture and allied sciences have created new pressures on the libraries of the agricultural universities inasmuch as these serve the needs of agricultural education, research and extension education. A university library is a necessary adjunct to the teacher's aid and a researcher's tool without which they cannot make the best use in an effective and efficient manner of their time or talents. A university library, being an integral part of a university must be developed into a dynamic institution where the staff and the students including the research workers would come for the advancement of their skills and for seeking assistance for changing their attitudes in the desired direction. A well-equipped library run by an efficient organisation is in fact the soul of an educational institution. Faculties however well-equipped and manned by competent staff would soon find themselves in a morass of intellectual stagnation, backwardness, if those are not supported by a dynamic, modern, uptodate and efficiently managed library. The development of the university library, therefore, has no limits. It is one institution which should continuously grow and should never be allowed to relapse into stagnation.

4. CHANGING NATURE OF AGRICULTURAL LIBRARIANSHIP

There has been a great increase in the academic library use per student because of changes in instructional methods. Formerly, the professor, who often had a rather parochial attitude towards knowledge, depended entirely on prescribed textbooks and lectures. Now, the student is often encouraged to read more widely and to do more independent literature searching. This change, along with greatly accelerated research and a vast increase in literature, has stimulated library use. The library has indeed become a vital instrument for education and research. In addition, libraries are being operated more efficiently through the use of scientific management methods. Great improvements in processing techniques and document delivery services have taken place through the adoption of new technologies by modern libraries.

5. TECHNOLOGY TRANSFER, CONCEPT, PROCESSES AND COMPLEXITIES.

Technology transfer connotes the movement of technology from its generation, through its dissemination and appropriate adaptation, to application in a given economic, political, social and cultural context. It also covers the communication of technological information,and the development of indigenous technology.

The transfer of technology is largely an information and communication process. It ranges from detailed documentation to the casual remarks. The achievement of effective transfer calls for special efforts on the part of both the donor and the recipient. This role is realised by the information centres who are seeking ways of shortening the distance between source and user and of making available interpretive services of a quality matched to the level of expertise of the user.

Agricultural university library information services play an important role in the transfer of technology. UNESCO believes that in this new context of technology transfer, the question of promotion of the flow of scientific and technological information assumes greater significance. The motivating factor in the transfer of technology usually is knowledge, falling into right hands. Technical information is a potential source of innovation, and the availability of and access to the latest information, published or otherwise recorded, is clearly vital. Technological information, being the product of technological research, takes the original form of write-ups by scientists and technologists and usually reported in scientific journals. Technology information needed is of three types. Researchers need abstracts of latest researches in the field. Industrialists need information regarding machines, markets, finance and competitiveness of technology. The management and the government need information on technical and financial options that are open, status of competitiveness of indigenous technology in relation to other countries, and its social implications, before a rational choice could be made.

Technology transfer is a very complex area. It is affected by various conditions of the environment. In order to make technology transfer effective and speedy, it is necessary to know the environmental conditions in which the technology has to be transferred, i.e. the local material resources, manpower, capital resources, technological requirements and desired level of development, the various technologies available, the sources from where the technologies can be obtained, the conditions for the import of technologies, their future implications to the receipient society, etc. Another important aspect of technology transfer is the assessment and evaluation of the technologies so that they may suit the environment and achieve the desired results.

The implications of technology transfer in developing countries are as follows:

(a) Policy decisions of the government in respect of the import of technologies, desired level of development, support for labour intensive technologies, etc.

(b) Local capabilities and resources to adopt the technology.

(c) Maintenance of the adopted technology, equipment, etc.

(d) Socio-economic benefits to be accrued from it.

(e) Ecological imbalances to be caused.

(f) Adequacy of information policy and support.

(g) Capability to select, evaluate, negotiate, acquire, adopt, and further develop the technologies.

In view of the above complexities, technology transfer needs a sound information base and information services to enable the policy makers to evolve right policies and to help adaptation, evaluation and application of relevent technologies for development.

6. TECHNOLOGY TRANSFER FOR RURAL SECTOR

Application of scientific and technological advances to development in the rural sector requires conditions and mechanisms different from those needed for development in the industrial sector. The technology for rural development not only includes adoption of new processes and practices in cultivation, but also manufacturing of the capital goods for the whole array of small scale and cottage industries fisheries, dairying, house construction and so on. This also requires the participation of a greater number of people at the grass-root level requiring not only science and technology information but also socio-economic information.

It has long been recognised that in dealing with rural population the use of individuals either from, or at least thoroughly acquainted with the locality, tends to produce a better response, especially when the contact is supported with practical demonstrations or audio-visual presentations in the language of the community. Regular broadcasts, discussions demonstrations of and popular lectures prove useful in communicating scientific, technical and other information related to development to rural audience.

The local tranditional techniques and practices in the rural areas need also be respected. Information on local traditions helps to relate imported technology and national research programmes to what rural areas need in developing appropriate technology.

In India there is a state communication channel going hand in hand with administrative structure operating at the national level for the transfer of new technology at lower level. Field workers of various development commissions, district officers, block development officers, and specialist extension officers in various fields comprise this channel. These officials in charge of development programmes of the state can be strongly supported with new technical information by creating a liaison with NISSAT and the agricultural library system in the country. Dr. Benor's T & V system also emphasizes the importance of technology transfer to the agricultural development programmes. The transfer of knowhow from specialist to farmer is ensured in two stages i.e. training and visit

Therefore, the agriculture university library system should be developed hand in hand with and linked to NISSAT to facilitate the flow of information down to the grassroot level. The agricultural library system should be further developed and existing libraries improved to ensure that every one has access to a library.

7. THE FUTURE OF INTERNATIONAL COOPERATION IN AGRICULTURAL INFORMATION

International cooperation in the collection, processing, and sharing of scientific and technical information takes many forms and can be accomplished through many agencies. There has been an almost universal recognition that information is both a national and international resource which should be utilised for the socio-economic and technological progress of mankind as a whole. Besides, no nation in the world, not even the most affluent and technologically advanced one, is now in a position to gather and handle effectively all the information generated in the world. This realisation has resulted in growing cooperation in the field. The launching of the UNISIST programme in 1971 by the UNESCO is a milestone in international cooperation in information handling. A number of international information systems and services, sponsored by various United Nations agencies , with the active participation of Member States, have been already established within the conceptual framework of UNISIST e.g. International Nuclear Information System (INIS), International Information System for Agricultural Sciences and Technology (AGRIS), Current Agricultural Research Information System (CARIS), Aquatic Sciences and Fisheries Information System (ASFIS), Global Environmental Monitoring Systems (GEMS), International Register of Potentially Toxic Chemicals (IRPTC), Industrial Information System (INDIS). Several information systems are in the process of being established e.g. Development Sciences Information System (DEVSIS), Science Policy Information Exchange System (SPINES). These international information systems and services should result in reducing, if not completely eliminating, duplication of information systems and services. These systems are particularly beneficial to developing countries most of which have neither the material resources or technical expertise to have large information systems of their own in various fields. Even developed countries have found them useful. As a result they are slowly discounting such national information systems that are no more needed because of the existence of a comprehensive international information system in the field. For example, the United States discontinued its Nuclear Science Abstracts started in 1948 when INIS Atomindex attained the status of a comprehensive international abstracting periodical in nuclear science and technology, in 1976.

8. SOURCE OF INFORMATION IN INDIAN AGRICULTURE

The most significant landmark in the field of documentation and information in the country is undoubtedly the launching of the National Information System for Science and Technology (NISSAT) by the Department of Science and Technology in May 1977. This unique system acts as a coordinating agency to interlink the existing and future information sources, systems and services in the field of science and technology into an effective national network. Although good progress has been achieved in the building up the system, the pace of its evolution into a national information network should be accelerated considering the ever-increasing requirements of the Indian scientific and technical community which is the third largest in the world.

Another significant landmark is the setting up of the National Informatics Centre (NIC) by the Electronics Commission. The Centre aims at providing the hardware and software for maintaining initially the following data bases required by several ministries/departments of the Government, namely, (1) data base on agriculture and environment information (2) data base on manpower information, (3) data base on industry and technology information, (4) data base on financial information. It has been planned to provide several interactive terminals to the user ministries and departments for ready access to the data bases. The NIC services will also be used by NISSAT through a terminal in the Department of Science and Technology.

9. TRAINING OF PERSONNEL

Personnel in agricultural research libraries will have to be more specialized in technical, agricultural and closely allied sciences, if we wish to provide more sophisticated information and bibliographic services to agricultural scientists. The courses offered by Insdoc and DRTC are quite comprehensive and the calibre of the trainees is generally satisfactory, but their intake should be enhanced to meet the increasing demand of existing and new documentation and information centres. Information technology is still in its infancy in the country. Documentation and information activities are by and large confined mostly to scientific organisations and institutions, national laboratories and some large public sector undertakings and private industrial firms. INSDOC, our national scientific documentation centre established in 1952, though has done excellent work in some areas, has not yet provided dynamic leadership to the country in the field of documentation and information technology.

10. AGRICULTURAL UNIVERSITY LIBRARY SYSTEM

As per the recommendations of the National Education Commission (1964), one agricultural university has been established in each state in our country. Recent emphasis on agricultural development have necessitated opening of more than one agricultural universities in same of the states in India. The main objectives of an agriculture university are: (i) Making provision for imparting education in different branches of knowledge, particularly agriculture, horticulture, veterinary and animal sciences, fisheries, forestry, agricultural engineering, home science and allied branches (ii) Furthering the advancement of learning and prosecution of research, particularly in agriculture and allied sciences. (iii) Undertaking extension work of such sciences specially to the rural people of the state; and (iv) such other purposes as the university may determine from time to time.

Taking into consideration the objectives of the agricultural university, the responsibility of the librarian turns out to be the establishment of a university library which will be central library and will cater to the needs of all the staff and students, research scientists, extension workers, specialists, teachers, policy makers and planners.

Some of the agricultural universities in India are multi-campus universities having constituent colleges imparting instructions in graduate and post graduate courses in Agriculture and Veterinary Sciences. In such cases constituent college libraries will have to develop college libraries for achieving the objectives of agricultural education, research and extension. Most of the agricultural universities in India have been established on the pattern of Land Grant Colleges in America and as such state governments have transferred their lands alongwith all the responsibilities of agricultural research, education and extension education to agricultural universities As a result of this, the agricultural research stations which were already in existence with the state governments have also been transferred to agricultural universities. In some of the agricultural universities rural institutes have been established as per the recommendations of Dr. Radhakrishnan Commission (13) for imparting training to the farmers. Recently, ICAR has established Krishi Vighyan Kendra under the administrative control of agricultural universities for imparting training to farmers in rural areas. In addition, ICAR has entrusted various operational research projects to the agricultural universities for the upliftment of backward areas. In the agricultural universities in Maharashtra, there are agricultural schools under the faculty of Lower Agricultural Education, which gives training to young boys after completion of their education upto 7th standard.

In an agricultural university, their should be a network of libraries starting from the university library which will serve as the central library for the whole of the agriculture university. Then comes college libraries, research station libraries, K.V.K.libraries, O.R.P. libraries and agricultural school libraries. The University librarian as Chief of this library system must collect the literature of various types concerning agricultural education and organise and develop the libraries in such a way that they render efficient and effective information services to clientele.

The various types of information material like bibliograhies, abstracts, indexes, reference books, periodicals, annual reports, research papers, directories, yearbooks, encyclopaedias, gazetteers, monographs, maps, atlases, bulletins, annual reviews, and advances should be procured to satisfy the demands of the academic community.

Further, university libraries should start the documentation and reprography services to meet the immediate requirements of research scientists.

11. CONCLUSION

11.1 Communication of new developments in agriculture and related fields to the agricultural scientists is the main task of agricultural universities in India and, therefore, providing adequate information support for academic research is the main concern of agricultural university libraries.

11.2 In order to play a vital and construction role in the nation building task in agricultural education, research, extension education, and to maintain communication process of information transfer to agricultural scientists, well-organised, well-developed, modern agricultural university libraries should be established by each agricultural university in India.

11.3 Efficient library and information services presuppose well-trained and well-qualified staff. Therefore, inservice training of library staff in documentation should be imparted by agricultural universities.

11.4 Indian Council of Agricultural Research should establish National Agricultural Library and Information System in collaboration with agricultural university libraries, IARI Library and ICAR institute libraries as vital sources of information in the country.

11.5 National responsibilities are coming to agricultural university libraries in India because they have knowledge and expertise and as such a network of libraries and information services should be established by the university librarians wherever there are multicampus agricultural universities with university library working as the central repositary library and college libraries, research station libraries, krishi vigyan kendra libraries, operational research project libraries and agricultural school libraries, forming the various nodes of the network to play a vital and constructive role in the process of technology transfer in agriculture.

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Statement about
"ANNALS OF LIBRARY SCIENCE AND DOCUMENTATION"
under Rule 8 of the Registration of Newspapers
(Central Rules 1956)

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2	Periodicity of its publication	Quarterly
3	Printer's Name Nationality Address	V. Ramachandran Indian Insdoc, Hillside Road,Delhi 12
4	Publisher's Name Nationality Address	V. Ramachandran Indian Insdoc, Hillside Road,Delhi 12
5	Editor's Name Nationality Address	B. Guha Indian Insdoc, Hillside Road, Delhi 12
6	Name and address of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital.	(an organisation of the Council of SCientific and Industrial Research, New Delhi)

I, V. Ramachandran, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dated: 29.2.1980

Sd. V. Ramachandran
Signature of Publisher

Annals of Library Science and Documentation
1980, 27(1-4), 41-44.

DEVELOPMENT OF AN APPLICATION SOFTWARE FOR ON-LINE INFORMATION RETRIEVAL

R. OJHA
D.K. BANDYOPADHYAY
S.R. KUNDU
INSDOC
Hillside Road
New Delhi-110012

A software package has been developed for on-line searching the INSPEC data base. Care has been taken to maintain the portability of the package so that it can be run on any third generation computer system. Details of the package and its utilisation for SDI service have been described.

INTRODUCTION

Research and development in the field of science and technology can be sustained only by regular flow of information which helps the scientists and technologists to keep track of development in their own fields all over the world and thus the chance of duplication of research is eliminated. Further, in an over-used cliche of information explosion, in the world of to-day, it is difficult for an individual scientist/technologist to go through a large number of scientific journals or other publications for the information he needs in his field of endeavour. Thus came into vogue the computerised Selective Dissemination of Information (SDI) service from the bibliographic data bases. After constructing the user scientist's/technologist's profile (knowing his field of endeavour) a suitable data base is searched at the SDI centre and searched result is dispatched to the concerned person. The computer operation associated with this type of searching is essentially a batch-mode operation. In the developed countries this type of information service has received well appreciation and acceptance from the user scientists. Again with the advent of the network operating computer system, the searching of a data base for giving SDI service can be taken away from the batch-mode operation and adapted to that of on-line searching which is now in vogue in the developed countries. In this paper the status of the SDI service (from INSDOC) in India and the feasibility for on-line searching the data bases has been briefly touched before discussing in detail the application package, developed for on-line searching the INSPEC data base.

2. SDI SERVICE IN INDIA (FROM INSDOC)

Canadian Institute for Scientific and Technical Information (CISTI) made a valuable contribution, by developing an application package named as CAN/SDI for giving SDI services in the early seventies. By this package different bibliographic data bases covering different subjects can be searched. Some of them are: CAS (Chemical Abstract Service), INSPEC(Information Services in Physics, Electrotechnology, Computer and Control), COMPENDEX (Computerised Engineering Index), NTIS (Government Report Announcements of the National Technical Information Service), ISI (Institute for Scientific Information) (i) Science Citation Index; (ii) Social Science Citation Index), etc., etc. Of these data bases INSDOC is getting the first three and SDI Centre of INSDOC is giving SDI service from CAS & INSPEC to the nation (about 450 user scientists) using CAN/SDI package, gifted by UNESCO. For rendering SDI service using CAN/SDI package there are five phases involved in the computer operation

1) Conversion phase
2) Compile profile phase
3) Search phase
4) Sort phase
5) Print phase

The package accepts two inputs i.e. (1) Data base tape, and (2) Profile information. The profile is constructed according to the need of the user scientist/technologist. So, apart from installing the package (package has been installed at IIT, Madras, Computer Centre) and constructing the profile, we (INSDOC) are depending on the foreign package for giving SDI services.

3. THE CONCEPT OF ON-LINE SEARCHING

It is quite natural that one will be tempted to ask the question, can we not develop our own application software to search the bibliographic data bases for giving services? And again when India is already having network operating system (like Cyber 170 model 720, housed at NIC, New Delhi) can we not explore the possibility of utilising the available system to render SDI service, on-line, by developing a suitable package? To answer these questions, we have come out with a project and as a first mission, have developed an application software which can search the INSPEC data base, on-line, according to the user's query. What an information seeker has to do is to enter his query at RJE (remote job entry) terminal. This query goes as data to the program package. The package program searches an issue of INSPEC data base tape, stored on a disk volume and displays one by one the 'hits' i.e., the records in the INSPEC data base tape that satisfy the query. One can also get the hard copy of the retrieved information, if desired.

4. DATA STRUCTURES OF THE INSPEC DATA BASE

INSPEC data base (1) comes in MARC format and is of variable length record format. Maximum record length is 6200 bytes (=characters). The tapes are unlebelled and in BCD character representation having physical record length of 2000 bytes (=characters). In MARC representation each bibliographic record is made up of three parts as given below.

1) First part is a fixed length leader (24 characters)
2) Second part is a variable length directory
3) Third part is the variable length data.

The leader: First five characters represent a number indicating the length of the record. Four characters (14th to 17th) represent a number indicating the length of the leader plus directory.

The directory: The directory is made up of a number of entries of equal length, viz, 12 characters each. The number of entries may vary from 1 to 49, depending upon how many types of bibliographic description the record contains.

One entry in the directory is made up of three parts

i) first three characters of the directory represent tag no.
ii) next four characters represent the length of data corresponding to the tag no.
iii) and last, five characters indicate relative position of information corresponding to the tag no. from the end of the directory.

Data: This portion contains the actual bibliographic information. 1$, 2$, 3$ act as separators for different kind of bibliographic information, and within one kind of information a $ acts as a separator if there are more than one information of the same kind.

5. DESCRIPTION OF THE APPLICATION SOFTWARE FOR ON-LINE SEARCHING THE DATA BASE

For on-line searching the data base, the entire data for INSPEC tape is made resident on the disk storage. As given in the description of the leader, 14th to 17th characters represent a number, indicating the length of the leader and directory. However, the leader is of 24 characters in length. So, the length of the directory can be easily calculated. Again, each directory entry is 12 characters in length. So, the length of the directory divided by 12 gives the number of directory entries. From each entry, the tag no. and the relative position of information, corresponding to the tag no. from the end of the directory can be obtained. Though 49 types of bibliographic information can be present in a record, rarely more than half of such bibliographic information occur in the record. If there are n number of bibliographic information present, the access points of the data base can be any of the n items or their combinations. However, most of the queries can be satisfied by searching author, title, journal, abstract, corporate author, institution, year of publication, keywords, language and coden, either singly or with combinations.

The following two-character codes have been adopted to indicate these items

1) AT - Author of the paper
2) TI - Title of the paper
3) JR - Name of the Journal
4) AB - Abstract of the paper
5) CA - Corporate Author
6) IN - Institutions (Author affiliation)
7) YR - Year of publication
8) KW - Keywords
9) LN - Language
10) CD - Coden

In the package these two-character codes are translated to their corresponding tag nos. Boolean logic has been utilized for the purpose of constructing the search expression, according to the need of the user scientist/technologist. Suitable format has been designed for writing the search expression. The following operators have been employed for constructing the search expression.

(1) 'AND' (&): This permits to select intersection of two concepts. A record satisfies the search if the terms or phrases connected by 'AND', all appear in one record.

(2) 'OR' (+): Permits to select union of two concepts. It allows more than one query to be searched in a single expression. No relationship among the term or phrases connected by 'OR' operator is required. A record satisfies the search if, at least one of the phrases or terms connected by 'OR' appears in the record.

3) 'AND NOT' (¬): This means AND followed by NOT. NOT alone is not needed in SDI type of activities because if we do not want to search any term we can simply ignore to mention it. A record satisfies the search if the term or phrase connected by 'AND NOT' does not appear in the record.

4) $ (Truncation): We can have any amount of truncation just by putting $ at the beginning or end of terms.

For illustration a sample search expression is written below

```
   TI  MICROPROCESSOR & TI CONTROL¬AT OJHA
 + TI MICROPROCESSOR & TI APPLIC $¬AT DK $
```

Each character code is followed by at least one blank, there can be any number of blanks throughout the search expression to improve readability. This type of search format has been designed so that any user will be able to write his/her search expression without any difficulty. Each term in the above sample search expression is searched against the corresponding item of data and Boolean expression is evaluated accordingly. If the particular record satisfies the Boolen conditions then it is considered to be the desired record and is displayed on the screen of the terminal which can also be printed if desired. In Annexure 1 a sample print-out has been shown for a typical search expression.

6. CONCLUSION

The application package developed by us, for on-line SDI service, has been tested with one issue of INSPEC data base having 7000 records. Several queries were put and the information retrieved was found satisfactory. Its advantage over CAN/SDI package regarding computer time and the type of results is to be studied.

7. ACKNOWLEDGEMENT

Authors are highly obliged to Dr N Seshagiri, Director, NIC and Dr N Vijayaditya for their guidance and helpful suggestions. They are also grateful to the Scientist-in-Charge INSDOC for providing necessary facilities and encouragment for carrying out this work.

REFERENCES

(1) INSPEC manual.Hertfordshire: Institution of Electrical Engineers

ANNEXURE - 1

QUERY:= TI INFORMATION & TI SYSTEM - TI CONTROL + TI MICROPROCESSOR & TI ENGINE

```
################################################################################################################
################################################################################################################
              INSPEC1 8020        30/09/80  INSPEC ARCHIVE 1573845 TO 1580256;SECTION%S< ABC

################################################################################################################
################################################################################################################
     26       KEYWORDS:- ,MICROPROCESSOR,ENGINE

****************************************************************************************************************
****************************************************************************************************************
TITLE:-       MICROPROCESSOR APPLICATIONS IN ELECTRICAL ENGINEERING. A BIBLIOGRAPHY %1977-1978<
ABSTRACT :-   ELECTRICAL ENGINEERING PROVIDES SCOPE FOR THE USE OF MICROPROCESSORS IN ALL ASPECTS OF CONTROL, IN POWER SYSTEMS, INSTRU
              MENTATION, MEASUREMENT, TEST EQUIPMENT AND DESIGN. IN COMMUNICATION SYSTEMS, ESPECIALLY. THEY CAN PERFORM A WIDE RANGE O
              F MONITORING AND CONTROL FUNCTIONS WITH GREAT SAVINGS OVER TRADITIONAL METHODS. THIS BIBLIOGRAPHY BRINGS TOGETHER ABOUT
              400 REFERENCES TO MICROPROCESSOR APPLICATIONS IN ELECTRICAL ENGINEERING. THEY WERE TAKEN FROM THE INSPEC DATABASE FOR TH
              E PERIOD 1977 TO 1978

****************************************************************************************************************
****************************************************************************************************************
     27       KEYWORDS:- ,MICROPROCESSOR,ENGINE

****************************************************************************************************************
****************************************************************************************************************
TITLE:-       MICROPROCESSOR APPLICATIONS IN ENGINEERING. A BIBLIOGRAPHY %1977-1978<
ABSTRACT :-   IN ENGINEERING THE INTRODUCTION OF MICROPROCESSORS HAS PROVIDED THE OPPORTUNITY TO ACHIEVE THE BENEFITS OF DIRECT DIGITA
              L CONTROL WITHOUT THE DISADVANTAGES OF CENTRALISED CONTROL. THEY CAN BE USED FOR ALL TYPES OF CONTROL OPERATION SIMPLY B
              Y PUTTING ONE IN A BOX AT EVERY SINGLE POINT WHERE CONTROL IS NEEDED. THEY HAVE THE ADDED ADVANTAGE OF BEING EXTREMELY C
              HEAP TO IMPLEMENT, ESPECIALLY WHEN COMPARED WITH OTHER CONTROL METHODS SUCH AS MINICOMPUTERS. THIS BIBLIOGRAPHY BRINGS T
              OGETHER ABOUT 150 REFERENCES TO MICROPROCESSOR APPLICATIONS IN ENGINEERING. THEY WERE TAKEN FROM THE INSPEC DATABASE FOR
               THE PERIOD 1977 TO 1978. IT IS DIVIDED INTO FOUR BROAD SUBJECT AREAS BASED ON THE INSPEC CLASSIFICATION, BUT TO ALLOW E
              ASY ACCESS TO SPECIFIC APPLICATIONS A SUBJECT INDEX IS APPENDED

****************************************************************************************************************
****************************************************************************************************************
     28       KEYWORDS:- ,INFORMATION,SYSTEM,CONTROL,

****************************************************************************************************************
****************************************************************************************************************
TITLE:-       TIPS' TECHNICAL INFORMATION PROCESSING SYSTEM
JOURNAL:-     J. SOC. INSTRUM. AND CONTROL ENG. %JAPAN<
AUTHOR:-      KAKAZU, Y.
VOL.ISSUE:-   VOL.19, NO.5

****************************************************************************************************************
****************************************************************************************************************
     29       KEYWORDS:- ,INFORMATION,SYSTEM,CONTROL,

****************************************************************************************************************
****************************************************************************************************************
TITLE:-       MICROPROCESSOR APPLICATIONS IN THE NEEDS INFORMATION ADAPTIVE SYSTEM
ABSTRACT :-   THE INFORMATIVE ADAPTIVE SYSTEM %IAS< IS AN ELEMENT OF THE NASA END-TO-END DATA SYSTEM %NEEDS< PROGRAM AND IS FOCUSED TO
              WARD ON-BOARD IMAGE PROCESSING FOR NASA MISSIONS IN THE 1980S. THE APPLICATION OF ADVANCED MICROPROCESSOR CONCEPTS FOR T
              HE CONTROL OF DEDICATED PROCESSING HARDWARE, AND ACTUAL DATA PROCESSING IS NECESSARY TO PROVIDE THE REQUIRED FLEXIBILITY
               AND PROGRAMMABILITY FOR A WIDE RANGE OF IMAGING APPLICATIONS. THE PAPER PRESENTS THE PRELIMINARY DESIGN OF THE INFORMAT
              ION ADAPTIVE SYSTEM AND DISCUSSES THE APPLICATION OF MICROPROCESSORS IN THE DEVELOPMENT OF THIS DATA PROCESSING CAPABILI
              TY. IN ADDITION, THE DESIRABILITY OF THE USE OF HIGH ORDER LANGUAGES FOR SOFTWARE DEVELOPMENT IS DISCUSSED
JOURNAL:-     12TH ANNUAL SOUTHEASTERN SYMPOSIUM ON SYSTEM THEORY
AUTHOR:-      HOWLE, W.M., JR.$LANE KELLY, W., IV$MEREDITH, B.D.

****************************************************************************************************************
****************************************************************************************************************
                    FEED BACK MESSAGE :----
              1     IS THIS REFERENCE USEFUL...                                     ..YES......NO....CAN,T TELL......COMMEN
              2     IS THIS REFERENCE USEFUL...                                     ..YES......NO....CAN,T TELL......COMMEN
```

Annals of Library Science and Documentation
1980, 27(1-4), 45-51.

ALTERED KEYWORD IN CONTEXT (AKWIC) INDEXING

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Indexing has been defined and the different processes involved in indexing have been enumerated. Automatic indexing and the various conditions that are to be met have been discussed. The definition of KWIC index, its origin and the method of its production have been delineated. Structure of KWIC index has been illustrated with the analogy of a horizontal wheel and a camera. It is stressed that continuity of the context at the extreme edges should be maintained whenever the beginning or the end of a title forms part of a KWIC entry. A modification in the output format of the KWIC index which can be called as the 'Altered KWIC' or AKWIC index, has been suggested. Advantages of AKWIC over KWIC have been mentioned. Some of the limitations of KWIC and AKWIC have been pointed out. Permutation on titles and permutation on subject headings for the production of KWIC index have been compared. It is suggested that adoption of KWIC index by Indian periodicals and organisations should be encouraged.

1. INTRODUCTION

Indexing has come to be accepted as a well-defined branch of the discipline of information science. It is recognised that indexes are indispensable tools for the dissemination and retrieval of information.

1.1 Definition of an Index

A good definition of an index could be quoted from the American National Standards Institute (ANSI) standard on indexing (1) "An index is a systematic guide to items contained in or concepts derived from a collection. These items or derived concepts are represented by entries arranged in a known or stated searchable order such as alphabetical, chronological or numerical". In short, an index is an indicator of content and location.

1.2 Process of Indexing

The process of creating the entries in an index is known as 'indexing'. The key operations in the indexing process are:

i. Scanning the collection
ii. Subject or content analysis
iii. Selection of identifiers
iv. Addition of locations

1.3 Mental Processes in Indexing

Now let us examine the mental processes involved in 'indexing'. The main question now is how an indexer goes about while he selects the indexing words. Some indexers particularly, the subject specialists, can read a text and 'understand' it, their understanding being shown, perhaps by their ability to formulate its subject in words other than those used by the author. Very little is known about the mental processes involved in such human understanding. Other indexers can not 'understand' a text in this full sense, but they are adept at picking out from it words, phrases, sentences that the author has emphasized as important, the title and section headings, introduction, conclusions, summary and so on. Some indexing systems like the present one under consideration deliberately restrict the selected phrases to the title words, to minimise the skill and effort needed at the stage of input to the system.

2. AUTOMATIC INDEXING

The phrase automatic indexing is usually used to indicate the application by a machine for any or all the stages in the process of indexing.

2.1 Conditions to be met

Automatic indexing in this sense requires (a) that the text of documents be in a form that can be 'read' by a machine (b) that the machine can 'recognise' individual words, and (c) that the machine be provided with the set of rules for selecting certain words and phrases as indexing entries.

2.2 The First Two Conditions

The first two conditions are met easily with the advent of the computer technology. The text can be made available in a machine readable form through codes on punched cards, punched paper tape, magnetic tape or disk etc. Such coded text can be 'read' and manipulated by digital computers.

2.3 Selection of Keywords

Selection of index words can be achieved by two alternative types of rules. In the first a human analyst compiles a list of key words of potential interest to future users of index, this list is compared by the computer with each word of the text of a document, if a match occurs, it is selected and these selected words make up the index entries for the document.

The second type of machine indexing works exactly on an opposite principle: a human analyst compiles a list of words that are not to be selected for indexing. These include all the common words such as 'the, of, an, on, a, that, are, not, to,be, for' and so on, and also 'general' words that have little specific meaning (e.g. in scientific texts are the words 'report' 'theory', 'conclusions', etc.). There still remain in each text hundreds or thousands of other words that can not be used as index entries. These are controlled by a method known as 'statistical indexing'. In this system, frequency count of each non-general word in the text is determined and then the most frequent words from this group are selected as the ones representing the subject matter (8). Since automatic indexing, by itself is a subject of specialization, let us not enter into the intricacies, as the above discussion provides enough general background to the topic of our present interest.

2.4 Mechanised Indexing based on Titles

The use of title words for indexing has long been common because of the least skill and effort needed for creating an index. It is also claimed that preparing indexes based only on titles is a method more widely practised than many indexers would be willing to admit. The use of only title words can be successful if titles do effectively describe a document's content. Because this is not always the case, they may be supplemented, to produce enriched title indexing. An important example is Biological Abstracts which examines the title of each article and if found inadequate, adds extra words to the title.

3. KWIC INDEX

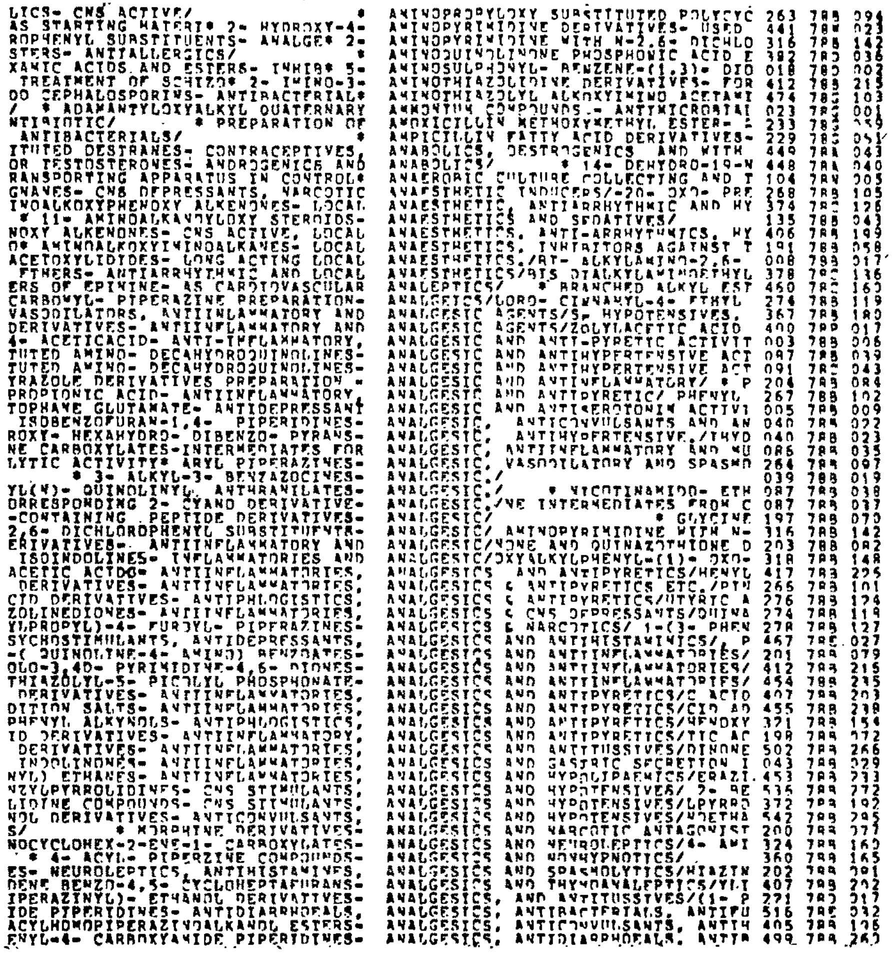
During the last two decades there have been applications of machines for the production of indexes using titles which are intended for normal manual use. The best known variety of such indexes is that developed by H.P. Luhn (6) and known as permuted or "Key-word-In-Context" (KWIC) index.

3.1 Definition

KWIC is a multiple entry natural language indexing system, which is produced by feeding to a computer the titles of the documents to be indexed and having the computer make one entry for each word in the title. The Computer moves the title laterally retaining the relative order of the words, but brings the entry word in the centre of the page, with the rest of the terms 'wrapped round' it, to keep the entryword in context (See figure 1).

3.2 Origin

It should be noted that KWIC indexing is new only in the method of its production i.e. by computer, and in its physical layout. The indexing principle involved must be the oldest that exists, in that it consists simply of using terms in a title to serve as index terms. The principles were written by Crestadoro (2) as far back as 1856, and catalogues probably had each term cited separately at the head of the entries to which it referred, in the manner of what is now known as the Key Word Out of Context (KWOC) index. Here the computer first prints the significant term for each entry and cites the title below it. Though the principles are very old, there is no doubt that the cheapness and speed with which such indexes can now be produced makes them a very attractive proposition, for some purposes.



```
LICS- CNS ACTIVE/                 *  AMINOPROPYLOXY SUBSTITUTED POLYCYC 263 788 094
AS STARTING MATERI* 2- HYDROXY-4-    AMINOPYRIMIDINE DERIVATIVES- USED  441 788 023
ROPHENYL SUBSTITUENTS- ANALGE* 2-    AMINOPYRIMIDINE WITH N-2,6- DICHLO 316 788 142
STERS- ANTIALLERGICS/             *  AMINOQUINOLINONE PHOSPHONIC ACID E 382 788 036
XANIC ACIDS AND ESTERS- INHIB* 5-    AMINOSULPHONYL- BENZENE-(1,3)- DIO 018 788 002
 TREATMENT OF SCHIZO* 2- IMINO-3-    AMINOTHIAZOLIDINE DERIVATIVES- FOR 412 788 215
DO CEPHALOSPORINS- ANTIBACTERIAL*    AMINOTHIAZOLYL ALKOXYIMINO ACETAMI 474 788 103
/  * ADAMANTYLOXYALKYL QUATERNARY     AMMONIUM COMPOUNDS.- ANTIMICROBIAL 023 788 001
NTIBIOTIC/          * PREPARATION OF AMOXICILLIN METHOXYMETHYL ESTER- = 233 788 159
 ANTIBACTERIALS/                  *  AMPICILLIN FATTY ACID DERIVATIVES- 229 788 051
ITUTED OESTRANES- CONTRACEPTIVES,    ANABOLICS, OESTROGENICS  AND WITH  449 788 043
OR TESTOSTERONES- ANDROGENICS AND    ANABOLICS/        * 14- DEHYDRO-19-N 448 788 040
RANSPORTING APPARATUS IN CONTROL*    ANAEROBIC CULTURE COLLECTING AND T 104 788 005
GNANES- CNS DEPRESSANTS, NARCOTIC    ANAESTHETIC INDUCERS/-20- OXO- PRE 268 788 105
INOALKOXYPHENOXY ALKENONES- LOCAL    ANAESTHETIC, ANTIARRHYTHMIC AND HY 374 788 126
 * 11- AMINOALKANOYLOXY STEROIDS-    ANAESTHETICS AND SEDATIVES/        135 788 043
NOXY ALKENONES- CNS ACTIVE, LOCAL    ANAESTHETICS, ANTI-ARRHYTHMICS, HY 406 788 199
O* AMINOALKOXYIMINOALKANES- LOCAL    ANAESTHETICS, INHIBITORS AGAINST T 191 788 058
ACETOXYLIDIDES- LONG ACTING LOCAL    ANAESTHETICS./BT- ALKYLAMINO-2,6-  008 788 017
 ETHERS- ANTIARRHYTHMIC AND LOCAL    ANAESTHETICS/BIS DIALKYLAMINOETHYL 378 788 136
ERS OF EPININE- AS CARDIOVASCULAR    ANALEPTICS/    * BRANCHED ALKYL EST 460 788 160
CARBONYL- PIPERAZINE PREPARATION-    ANALGETICS/LORO- CINNAMYL-4- ETHYL 274 788 119
VASODILATORS, ANTIINLAMMATORY AND    ANALGESIC AGENTS/S- HYPOTENSIVES,  367 788 180
DERIVATIVES- ANTIINFLAMMATORY AND    ANALGESIC AGENTS/ZOLYLACETIC ACID  400 788 017
4- ACETICACID- ANTI-INFLAMMATORY,    ANALGESIC AND ANTI-PYRETIC ACTIVIT 003 788 006
TUTED AMINO- DECAHYDROQUINOLINES-    ANALGESIC AND ANTIHYPERTENSIVE ACT 097 788 039
TUTED AMINO- DECAHYDROQUINOLINES-    ANALGESIC AND ANTIHYPERTENSIVE ACT 091 788 043
YRAZOLE DERIVATIVES PREPARATION -    ANALGESIC AND ANTINFLAMMATORY/ * P 204 788 084
PROPIONIC ACID- ANTIINFLAMMATORY,    ANALGESIC AND ANTIPYRETIC/ PHENYL  267 788 102
TOPHANE GLUTAMATE- ANTIDEPRESSANT    ANALGESIC AND ANTISEROTONIN ACTIVI 005 788 009
 ISOBENZOFURAN-1,4-  PIPERIDINES-    ANALGESIC,  ANTICONVULSANTS AND AN 040 788 022
ROXY- HEXAHYDRO- DIBENZO- PYRANS-    ANALGESIC,  ANTIHYPERTENSIVE./THYD 040 788 023
NE CARBOXYLATES-INTERMEDIATES FOR    ANALGESIC, ANTIINFLAMMATORY AND MU 086 788 035
LYTIC ACTIVITY* ARYL PIPERAZINES-    ANALGESIC, VASODILATORY AND SPASMO 264 788 097
      * 3- ALKYL-3- BENZAZOCINES-    ANALGESIC./                        039 788 019
YL(N)- QUINOLINYL ANTHRANILATES-     ANALGESIC./     * NICOTINAMIDO- ETH 087 788 038
ORRESPONDING 2- CYANO DERIVATIVE-    ANALGESIC./NE INTERMEDIATES FROM C 087 788 037
-CONTAINING .PEPTIDE DERIVATIVES-    ANALGESIC/                 * GLYCINE 197 788 070
2,6- DICHLOROPHENYL SUBSTITUENTS-    ANALGESIC/ AMINOPYRIMIDINE WITH N- 316 788 142
ERIVATIVES- ANTIINFLAMMATORY AND     ANALGESIC/NONE AND QUINAZOTHIONE D 203 788 082
 ISOINDOLINES- INFLAMMATORIES AND    ANALGESIC/OXYALKYLPHENYL-(1)- OXO- 318 788 148
ACETIC ACIDS- ANTIINFLAMMATORIES,    ANALGESICS  AND ANTIPYRETICS/HENYL 417 788 225
 DERIVATIVES- ANTIINFLAMMATORIES,    ANALGESICS & ANTIPYRETICS ETC./PIN 265 788 101
CID DERIVATIVES- ANTIPHLOGISTICS,    ANALGESICS & ANTIPYRETICS/UTYRIC A 276 788 124
ZOLINEDIONES- ANTIINFLAMMATORIES,    ANALGESICS & CNS DEPRESSANTS/QUINA 274 788 119
YLPROPYL)-4- FUROYL- PIPERAZINES-    ANALGESICS & NARCOTICS/ 1-(3- PHEN 278 788 127
SYCHOSTIMULANTS, ANTIDEPRESSANTS,    ANALGESICS AND ANTIHISTAMINICS/, P 467 788 027
-( QUINOLINE-4- AMINO) BENZOATES-    ANALGESICS AND ANTIINFLAMMATORIES/ 201 788 079
OLO-3,4D- PYRIMIDINE-4,6- DIONES-    ANALGESICS AND ANTIINFLAMMATORIES/ 412 788 215
THIAZOLYL-5- PICOLYL PHOSPHONATE-    ANALGESICS AND ANTIINFLAMMATORIES/ 454 788 235
 DERIVATIVES- ANTIINFLAMMATORIES,    ANALGESICS AND ANTIPYRETICS/C ACID 407 788 203
DITION SALTS- ANTIINFLAMMATORIES,    ANALGESICS AND ANTIPYRETICS/CID AD 455 788 238
PHENYL ALKYNOLS- ANTIPHLOGISTICS,    ANALGESICS AND ANTIPYRETICS/HENOXY 321 788 154
ID DERIVATIVES- ANTIINFLAMMATORY,    ANALGESICS AND ANTIPYRETICS/TIC AC 198 788 072
 DERIVATIVES- ANTIINFLAMMATORIES,    ANALGESICS AND ANTITUSSIVES/DINONE 502 788 266
 INDOLINONES- ANTIINFLAMMATORIES,    ANALGESICS AND GASTRIC SECRETION I 043 788 029
NYL) ETHANES- ANTIINFLAMMATORIES,    ANALGESICS AND HYPOLIPAEMICS/ERAZI. 453 788 233
NZYLPYRROLIDINES- CNS STIMULANTS,    ANALGESICS AND HYPOTENSIVES/ 2- BE 535 788 272
LIDINE COMPOUNDS- CNS STIMULANTS,    ANALGESICS AND HYPOTENSIVES/LPYRRO 372 788 192
NOL DERIVATIVES- ANTICONVULSANTS,    ANALGESICS AND HYPOTENSIVES/NOETHA 542 788 295
S/          * MORPHINE DERIVATIVES-  ANALGESICS AND NARCOTIC ANTAGONIST 200 788 077
NOCYCLOHEX-2-ENE-1- CARBOXYLATES-    ANALGESICS AND NEUROLEPTICS/4- AMI 324 788 160
 * 4- ACYL- PIPERZINE COMPOUNDS-     ANALGESICS AND NONHYPNOTICS/       360 788 165
ES- NEUROLEPTICS, ANTIHISTAMINES,    ANALGESICS AND SPASMOLYTICS/HIAZIN 202 788 091
DENE BENZO-4,5- CYCLOHEPTAFURANS-    ANALGESICS AND THYMOANALEPTICS/YLI 407 788 202
IPERAZINYL)- ETHANOL DERIVATIVES-    ANALGESICS, AND ANTITUSSIVES/(1- P 271 788 017
IDE PIPERIDINES- ANTIDIARRHOEALS,    ANALGESICS, ANTIBACTERIALS, ANTIFU 516 788 032
ACYLHOMOPIPERAZINOALKANOL ESTERS-    ANALGESICS, ANTICONVULSANTS, ANTIH 405 788 136
ENYL-4- CARBOXAMIDE PIPERIDINES-     ANALGESICS, ANTIDIARRHOEALS, ANTIR 499 788 263
```

Fig.1. Sample KWIC index (produced by the author)

KWIC and KWOC indexes are often loosely referred to as "permuted" or 'permutation' indexes, but Sharp (7) points out that this term is incorrect since it implies arrangement in alternative orders, which does not happen in this type of index. He prefers the term "cycling" and D.J. Fosket (3) uses the expression "rotated" indexes.

3.3 Illustrations of the Structure

For the purpose of illustration of the structure of the KWIC index, let us take the following title, as an example, viz.

Histamine receptors in brain.

Let us now construct the KWIC entries for this title as the computer does it. The title is read word by word. The first word viz. 'Histamine' is read. It is checked whether it is a keyword or not. Since it is a keyword it is pushed to the central index column and the remaining words are printed as they occur in the title. Next, the second word viz. 'receptors' is read and since it is a keyword, the first word is pushed to the left hand side of the central column and the second keyword is brought to the central index column position and the rest of the title is continued after that. Again the third word viz. 'in' is taken and is ignored without constructing any index entry, since 'in' is not a keyword. Similarly, the word 'brain' is taken and an index entry is constructed after pushing the rest of the title to the left hand side of the central index column. For the above title, KWIC index entries for the words histamine, receptors, and brain are constructed while the word 'in' is ignored, as follows:

```
                        Central
                        index
                        Column
                        HISTAMINE RECEPTORS IN BRAIN/
             HISTAMINE  RECEPTORS IN BRAIN/
HISTAMINE RECEPTORS IN  BRAIN/
```

It is to be noted here that in the above illustration the 'wrapping round' has not been shown. In case the title is longer than the space on the right hand side of the central index column then to make use of the full potential of the space available, the rest of the title is printed on the left hand side on the same line, as shown below:

IN BRAIN/   HISTAMINE RECEPTORS
HISTAMINE RECEPTORS IN BRAIN/
INE RECEPTORS IN BRAIN/   HISTAM

Similarly in the third entry above, the part of the first word that spills over on the left hand side is brought on the right hand side to make use of the empty space available, for providing maximum possible information to supply the context.

3.4 Analogy of a Wheel and a Camera

The process can be explained in a vivid manner by imagining a horizontial wheel of 1 or 2 cms thickness on whose curved surface is written the title as shown in figure 2.

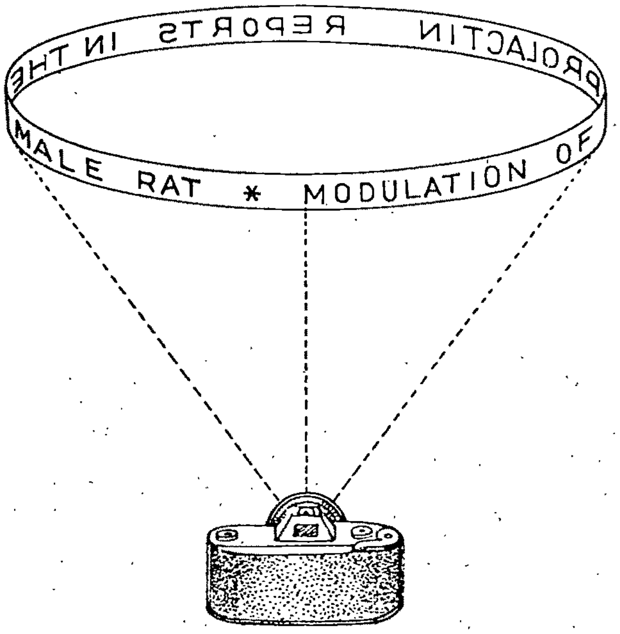


Fig.2. Illustration of the KWIC entry formation

It should be visualized that the axis of the lense system of the camera passes through the centre of the wheel and the horizontal plane of the circumference of the wheel.

As soon as the key-word comes in front on an imaginary camera, the title available on the front side, if photographed, one gets a KWIC entry. The KWIC entries of the Biological Abstracts are rotated in this fashion by joining the beginning and end of the title in the form of a circular loop whose diameter is equal to the width of the KWIC index. In such a process there will be some amount of discontinuity in the context as the last word of the title sometimes may not have direct conceptual link with the first word of the title.

In the opinion of the author the following way of creating entries is more helpful than the one explained above. That is, the imaginary wheel will not contain any thing on the opposite side not facing the camera. The title after the right hand edge will immediately continue at the left hand edge as shown in figure 3.

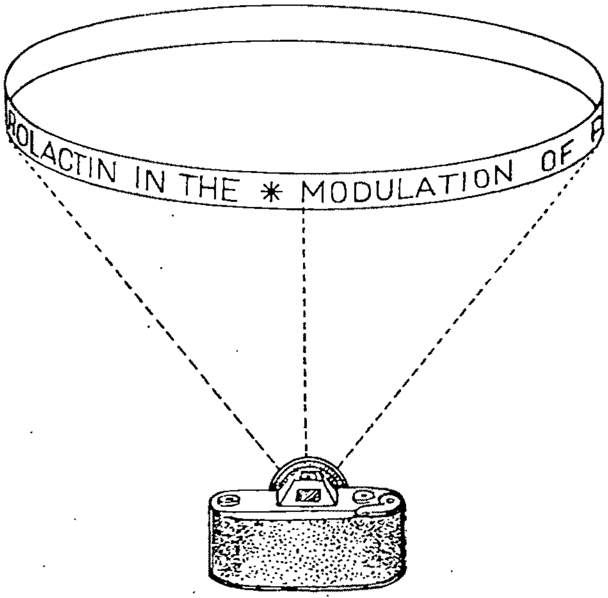


Fig.3. KWIC entry with continuity of context at the edges.

This means always continuity in the context is maintained between the edges except when neither the beginning of the title nor the end of the title is facing the camera. In the latter case it is like a slit instead of a wheel through which the title is being passed as shown in figure 4. Of course the width of the slit is equal to the width of the index.

The slit phenomenon starts operating particularly when the title is longer than the width of the KWIC index. After the KWIC entries have been created for all the input titles, the entries are sorted in the alphabetical order of the key words at the central column.

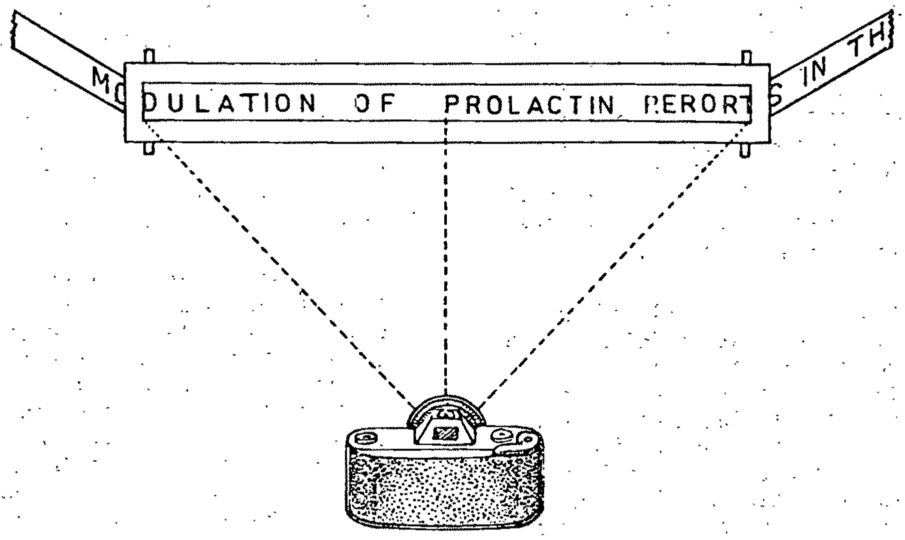


Fig.4. Illustration of the slit phenomenon.

If these entries are printed with the corresponding location, against each of them, then the resultant product is the actual KWIC index ready for use.

3.5 Method of Production

KWIC entries may be prepared in two ways:

(a) The title may previously be scanned by an editor and each significant word tagged. An entry will be constructed by the computer for each tagged word.

(b) The computer may be supplied with a list of stopwords known as 'Stop list' which contains insignificant words such as articles, prepositions, conjunctions, pronouns, auxillary verbs together with such general words as 'aspect', 'different', 'method', 'problem' and 'very' etc. which are believed to be of little value in retrieval. An entry will be constructed by the computer for each title word not on the stop list.

Whichever method is used, the entries are then sorted into alphabetical order of the entry word and printed out-against each entry being its appropriate location indicator. The construction of entries by use of a 'stop list' is much more common than by tagging significant words since less intellectual effort is required at the input stage. Some stoplist are quite short, and others extend to several thousand words. The longer the list the fewer the index entries one would expect (8). Helbich (5) attempted to find some relation between the number of stopwords and the keywords per title. It was found that there was no simple dependence between the number of stopwords and the entries in a KWIC index. He also concludes that selection and tagging of title words provides a briefer and better index than the use of the stop list.

3.6 Alteration in the KWIC Format

The author has produced an annual commulative KWIC index for one of the current awareness bulletins published by his information centre (Fig.1). The details of which are being reported elsewhere.

When the annual KWIC index along with an introduction and instructions on 'how to refer it', was sent for the users' comments, following few observations were made. While some of the intelligent users could immediately grasp the utility of the KWIC index, a number of users could not understand why the alphabetical arrangement is at the central column instead of at the beginning or at the first column of the index. The continuity of the context at the edges was a very inconvenient thing for them since they were exposed to such a type of index for the first time. They immediately suggested not to alphabetize the index at the central column and let the alphabetization be in the first column or at the beginning of the index. They also opined that let the title be printed continuously along the full width of the index in only a single column like a conventional type of index, instend of the double column format as in a KWIC index.

This meant changing the total structure and format of the KWIC index as accepted everywhere. After a serious thinking it occured that why not combine the advantages of the conventional index with those of the KWIC index and give the users a newly formatted KWIC index which they might find more convenient. Eventhough the whole concept is in the idea plane, it is presented here with a view of getting comments or suggestions.

The altered KWIC (i.e. AKWIC if one prefers to call it) format is as follows. The width of the index remains the same. Now instead of the camera being placed at the middle of the wheel it is placed at the extreme left edge of the wheel as shown in figure 5. Here again obviously the axis of the lense system of the camera is tangential at the extreme left edge of the wheel and also passes through the horizontal plane of the circumference of the wheel.

The AKWIC entries for our previous examples now get rearranged as shown below in figure 6.

BRAIN/ HISTAMINE RECEPTORS IN
HISTAMINE RECEPTORS IN BRAIN/
MALE RAT/TION OF PROLACTIN REPORTS IN
MODULATION OF PROLACTIN REPORTS IN MALE
PROLACTIN REPORTS IN MALE RAT/TION OF
RAT/TION OF PROLACTIN REPORTS IN MALE
RECEPTORS IN BRAIN/ HISTAMINE
REPORTS IN MALE RAT/TION OF PROLACTIN

Fig.6. Sample AKWIC index without location part.

When the AKWIC entries are examined carefully they are exactly similar to the KWIC entries except that, now the alphabetical arrangement is like a conventional index and the continuity of context at both edges, like, in a KWIC index, is still maintained. The advantage of the utilization of the total available space for providing the maximum information as in KWIC index, has also been made use of AKWIC now has a better readability and still maintains the key word in context. While in KWIC the context is immediately on both the sides of the key word, in AKWIC the left hand part of the context goes to the extreme right edge as shown in the figure 6.

4. DRAWBACKS OF KWIC INDEX

The main draw back with the indexes of this kind is that it is possible to search for only one index term at a time, and there is no possibility of co-ordinating terms except by scanning the block of entries under one of the chosen search terms. If the number of entries under a given term is small enough this process of scanning causes no difficulty but with indexes of the KWIC or AKWIC type the number of such entries is likely to be very high for large collections of documents.

Let us take some examples from a hypothetical index and examine the nature of the problem for different conditions. Let us call D_n the number of documents in a collection and T_n the average number of terms assigned to a document. Now, if the repetitions of the terms are taken into account, the total number of terms is the product ($D_n \times T_n$). In practice repetitions generally do occur. If each term is counted only once, then the total number of terms V_n in the vocabulary is less than or equal to the product ($D_n \times T_n$)

$$\text{i.e.} \quad V_n \leqslant D_n \times T_n.$$

Hence, A_n the average number of entries under one term in a KWIC index can be represented by the formula

$$A_n = \frac{D_n \times T_n}{V_n}$$

If the value of A_n in a given situation is low, then searching the index will cause no problems. If it is high, then KWIC may be unacceptable and resort may have to be made to post co-ordinate indexing system. This can be explained using the following illustration.

4.1 Illustration

With a collection of 50,000 documents, a vocabulary of 1,000 terms and an average of 10 terms used for each document in indexing, the average number of entries to be scanned in a search, works out to be 5,000. This is much too high a figure to be acceptable.

If however, we have a collection of 25,000 documents, a vocabulary size of 25,000 terms, and an average number of terms used per document of 5, then only 50 entries would have to be scanned in a search on an average.

This does not take into account the fact that it may be desirable to be able to perform logical product, sum and difference searches, though where the number of entries to be scanned is low it is now difficult to examine each to determine whether it meets the search requirements. However, titles tend to indicate the content of documents to a rather shallow degree and if detailed indexing is carried out at all, the KWIC principle is unlikely to be acceptable.

In whatever way KWIC or KWOC indexes are prepared, they create two problems in search. First, although each entry word is accompanied by the rest of the title'in' or 'out' of context, scanning the index to coordinate two or more search words is not an easy task. Second, words are used as they are provided by authors in titles and to ensure adequate recall, the searcher must think of alternative spellings (or even mis-spellings). Singular and plurals, synonyms and quasi-synonyms or in short, the search terms must be considerably expanded multiplying the scanning effort. Savings at the input may be more than balanced by the work to be done at output.

5. PERMUTATION ON SUBJECT HEADINGS

A byproduct of a computerised catalogue can be a KWIC index. KWIC indexes, as already stated, are usually permuted on titles, but the possibility of permuting on subject headings has been seriously considered. University Library Information Systems Project of the University of Illinois, compared permuting on titles and permuting on subject headings and decided that latter would be more useful in the general library situation, where titles are less specific. Permutation on subject headings is not practical for an entire collection, but is a promising means of dealing with limited special areas of the collection(4).

6. CONCLUSIONS

(i) The KWIC index has been much popular abroad than in India. While major abstracting serivce like Biological Abstracts has adopted it as its regular feature, several other periodicals and organisations abroad have employed it for providing better information retrieval tool, than the conventional index. Inspite of the fact that a number of computers are available in India, there has hardly been any attempt either to produce KWIC index or to adopt it as a regular feature by any periodical or organisation in India.

Even an organisation like Publications and Information Directorate, which is publishing a number of scientific and technical periodicals is satisfied with the Keyword out of Context (KWOC) index and the conventional type of indexes. Even the method of generating KWOC is totally different. It appears as if it is not completely automated. The acutal methodology is nothing but exactly the KWIC index methodology, but for the output format of the index.

The reason for KWIC not being popular in India might be due to the fact that it has not been adopted by many. The reason due to which KWIC has not been adopted by many in India might be due to the fact that KWIC index apparently might look complex in the beginning for the users and also because of the some what complex programming involved. But once the users get familiarity with the KWIC index, they are likely to find it quite useful. Therefore adoption of KWIC index in India must be encouraged.

(ii) Experiments can also be done on the utility and convenience of AKWIC index suggested in this paper. If AKWIC is more acceptable than KWIC, because of it's lesser complexity than the latter, then attempts can be made to adopt it in a large scale.

(iii) The generation of KWIC index need not be an independant attempt. When so much is being talked about creating India's own databases, the generation of KWIC index can be done as a byproduct of the computerised catalogues or the databases that would be created.

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ELECTRON LATTICE SCATTERING TECHNIQUE FOR CITATION ANALYSIS AND EVALUATING THE IMPACT OF RESEARCH PAPERS

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Introduces a physical model for measuring the impact of research contribution based on scattering of electrons by the lattice atoms. Describes scattering as a stochastic process and adopts an analogous situation in which lattice atoms and electrons have been replaced by a system of research papers and potential citers respectively. In the construction of the above model, the authors have made a number of simplifications and assumptions and developed an Absorption Index Activity to be used as indices for measuring relative impact of various contributions in a given field of scientific research.

Scientific papers are the end product of scientific research and they have many attributes The most important being its links in a series of citations or references pertaining to previous literature. The citations analysis as a tool to study the internal dynamics of Science and its laws of development received considerable impacts during the early sixties. The citation analysis has been used to study the:

(i) Linkages of contemporary research with the previous efforts and at different places;

(ii) The emergence of specialities and branching off of a discipline into an independent subject of study;

(iii) Emergence and formation of invisible colleges of people working in the similar or related areas;

(iv) Diffusion of new developments in the main-stream of scientific developments and literature;

(v) The network of communication pattern among the scientists; and

(vi) Evaluation of productivity of scientists.

Inspite of the various limitations in the use of citation analysis, the above aspects have led to quantitative analysis of scientific developments and many significant sociological studies have been conducted during the last decade and a half. The most significant among them being those by Cole and Cole; Solla Price; Diana Craine, Garfield, etc.

Of late there have been a few attempts to study the qualitative aspect of research papers, with the help of citation analysis. Cole, in a study of university physicists, has concluded that relatively few physicists themselves base their work almost wholly on research results of a relatively small number of scientists(1). Derek De Solla Price, has also suggested that, if we could identify a few of the "really important' papers with wide circulation and higher visibility then we shall find that they make considerable impact on the new literature that is generated (2). Whereas, without taking the validity of the assumption, itself, the researchers have begun to accept the evaluation of significance and importance of citation count as a valid criteria (3,4,5,6). Some doubts have been expressed on this technique by studies conducted at the Case Institute

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Died in January 1979

of Technology (7). The difficulty arises because the crude citation count are only useful for comparing papers which have been published simultaneously i.e. in the same calendar year. For mutual comparison of articles published at different times, the average number of yearly references to these becomes important. For most of the papers the number of citations per year decay in the course of time, almost like the decay of a radioactive source. Under these circumstances the age of a research paper becomes an important factor.

To be objective, this would necessitate that more recent citation to an older paper should be weighted more heavily than those given immediately after the publication of the particular study. The basic problem here is to evolve a procedure of allocating weights to such papers so that their evaluation assumes objective validity. Chang (8) and Solla Price have evolved procedure to determine such weights. Following their line, we have also attempted to evolve a stochastic method based on electron lattice scattering technique, for allocating weights to such papers with a view to evaluate their impact. The results have been applied to the analysis of the publications in a narrow field of Nuclear Magnetic Resonance published in India during the period 1965-70. A brief description of the technique is given in the succeeding paragraphs.

ELECTRON-LATTICE SCATTERING

The scattering of electrons may be caused by several types of lattice defects: by temperature & vibrations (phonon scatterings), by impurities (both interstitial and substitutional) and by mechanical deformations (which produces dislocations, vacancies and interstitials). To understand the behaviour of metals as described above, we examine the nature of the scattering process itself and more closely the concept of mean free path.

For a group of electrons passing through the lattice in the x-direction, the number $dN(x)$ that makes a collision in some length of path dx at position x is given by

$$dN(x) = \frac{-N(x)dx}{\lambda} \qquad (1)$$

Where $N(x)$ is the number of electrons which have still to make a collision at position x in this equation, λ is simply a constant parameter to satisfy dimensional requirements, it can be shown that

$$\lambda = |v_f|(2\tau) \qquad (2)$$

where V_f is the speed of the electrons at the top of the fermi distribution and 'τ' is the relaxation time.

In our mode of citation analysis which is given in the subsequent section, we would see that τ is identical to the age of the publication of research paper and 'v_f' is identical to the frequency of citations of that paper.

The constant λ introduced in equ.(2) is in fact, not the distance between collisions for every trajectory; it is simply an average value.

Equation (1) is based on the premise that an electron has a constant probability of making a collision in each interval dx. Eq.(1) can be integrated to give the number of electrons remaining in the group after it has traversed a distance x.

$$N(x) = N_o \, e^{-x/\lambda} \qquad (3)$$

where N_o is the number of electrons in the group at the beginning.

In Eq.(3) λ has the same meaning as mean life does in radioactive decay. Since the number drops to $(\frac{1}{e})$th of its original value when x takes the value λ.

The number of states in the sphere of momentum space which has a certain value of p, say P_f(electrons with the fermi energy) is equal to the total no. of electrons and it can be shown that

$$N = \frac{4\pi}{3} \frac{P_f L^3}{h^3} \qquad (4)$$

where h^3/L^3 is the minimum volume of uncertainity in the momentum space, i.e. (where the basic uncertainty of momentum in each duration is h/L for a cube of edge, L of an actual three dimensional crystal)

$$\Delta P_{x\,\text{trans}} \, \Delta P_{y\,\text{trans}} \, \Delta P_{z\,\text{trans}} = h^3/L^3\text{-}$$

translational

This volume is sketched in Fig 1.

Since $N(x)$ is the distribution function for collisions, according to Eq.(4),

$$\bar{x} = \frac{N_o \int_0^\infty x\, e^{-x/\lambda} dx}{N_o \int_0^\infty e^{-x/\lambda}\, dx} = \lambda$$

The further derivation leading to construction of Absorption Index Activity (AIA) is given in the section of Citation Analysis.

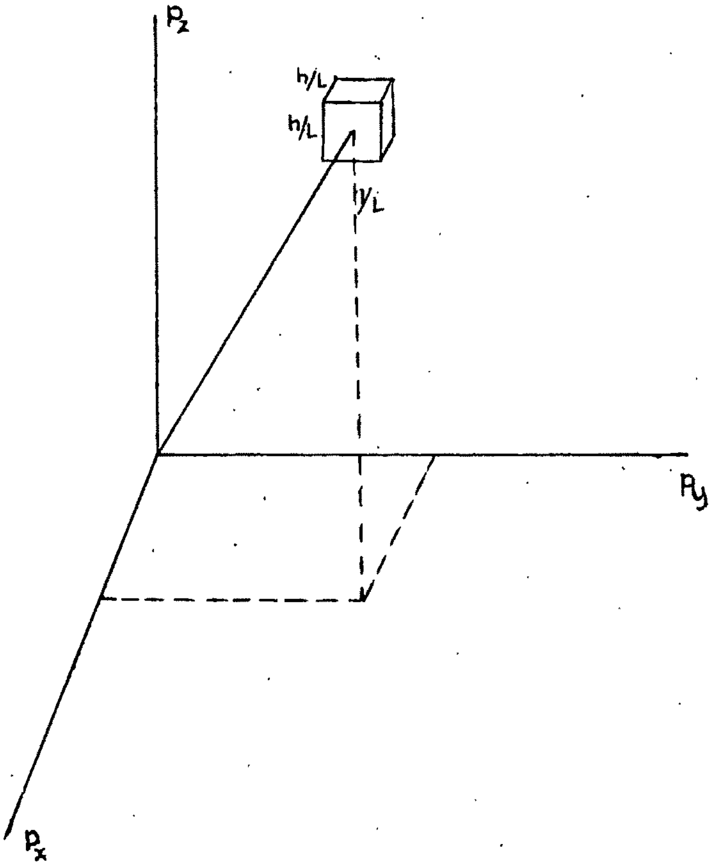


Fig.1. Uncertainty volume of a translational state of an electron in a band.

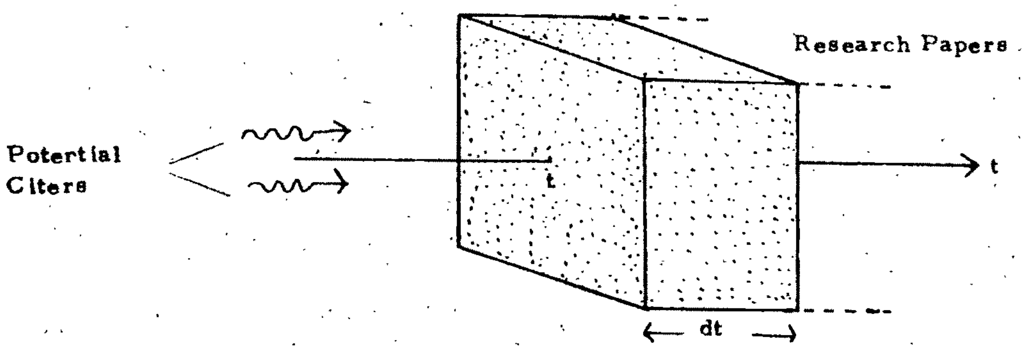
THE ABSORPTION INDEX ACTIVITY (AIA) OF A PUBLICATION

In order to be able to compare the impact of various papers published at different times in a subfield of physics, we introduce an impact parameter, called the Absorption Index of Activity (AIA). The AIA of a paper gives essentially a weighted average number of references to that paper per year. This would also take into account the age of the paper. Another important point that we have taken into consideration, is that we have taken citation by different potential citers during a particular period of time, say one calendar year only. The fact that multiple citations by one particular citer cannot be regarded as independent. As it is very obvious that a paper, cited by 'n' different potential citers in a particular period should be weighted more heavily than the same paper receiving 'n' citations by a potential citer in the same period, thus we have avoided multiple citations by the same citer in a particular period. The AIA is constructed as follows:-

Starting on the basis of the scattering of a group of electrons which may be caused by several types of lattice defects, the impact of a research paper can be worked out by several types of contribution by a research paper.

** The standing of the author
** Nature of the author's work i.e. its access to literature, fundamental theoretical, applied, etc.
** The standing of the institute, etc,etc.

Analogous to the group of electrons, we have taken a group of potential citers and to a lattice, a system containing research papers which are free to be collided by any potential citer, completely in a stochastic manner, collision, assuming a research paper getting into the eyes of a potential citer and ready for the reference by the potential citer.



ON COLLISION AS A PROBABILISTIC PROCESS AND DECAY RATE OF COLLISIONS

For a group of potential citers interacting with research papers in the year t, the number dN(t) that makes a collision in some length of time dt in the year t is given by

$$dN(t) = - \frac{N(t)dt}{\lambda} \qquad (1)$$

where N(t) is the number of potential citers which have still to make a collision in the year t.

In this equation λ is simply a constant parameter to satisfy dimensional requirements. Equation (1) is based on the premise that a potential citer has a (equal) probability of making a collision in each interval dt. This gives us the number of potential citers, remaining in the field (i.e. lattice space) after a period t, as:-

$$N(t) = N_o\ e^{-t/\lambda} \qquad (2)$$

where N_o is the number of potential citers in the group at the beginning.

In equation (2), λ has the same meaning as "mean-life" has in radioactive decay, since the number drops to (1/e)th of its original value when t takes the value λ. The parameter λ is the average time-length between collisions. Since N(t) is the distribution function for collisions, we have

$$\bar{t} = \frac{No \int_0^\infty t\, e^{-t/\lambda}\, dt}{No \int_0^\infty e^{-t/\lambda}\, dt} = \lambda$$

$$\text{or } \lambda = \frac{\int_0^\infty t\, dN(t)}{\int_0^\infty dN(t)} \qquad (3)$$

where dN(t) is the number of collisions in the year t.

This equation will give us the value of 'Mean-Life' λ. As λ is the time in which the average number of potential citers reduces to (1/e) part of its original value. λ^{-1} describes the rate at which research papers are becoming obsolete in the field under consideration.

Now we seek for the mean value of the decay of potential citers during a particular period, i.e.

Consider a particular paper which has interacted (referred to) by dN_o, dN_1, dN_2................................... dN_{n-1} different potential citers in the successive years to t_1.............................. t_{n-1}, then

$$I = \sum_{i=0}^{n-1} - \frac{No}{\lambda}\ dt_i \quad \frac{\sum_{i=0}^{n-1} dN_i}{\sum_{i=0}^{n-1} e^{-t_i/\lambda}} \qquad (4)$$

$$* \quad dN(t) = \frac{-N(t)\ dt}{\lambda} = \frac{-No\ e^{-t/\lambda}\ dt}{\lambda}$$

$$\therefore \quad No\ e^{-t/\lambda}\ dt = \lambda\, dN(t)$$

$$\therefore \quad \frac{No \int_0^\infty t\, e^{-t/\lambda}\, dt}{No \int_0^\infty e^{-t/\lambda}\, dt} = \frac{\lambda \int_0^\infty t\, dN(t)}{\lambda \int_0^\infty dN(t)} = \frac{\sum_{i=0}^{n-1} t_i\ dN_i}{\sum_{i=0}^{n-1} dN_i} \quad \text{(for descrete functions)}$$

we can put the value of λ from Equ.(3) into Equ. (4) and evaluate 'I'.

'I', we have called as the Absorption Index Activity (AIA).

Thus we conclude if 'I' is high, that will mean, high reduction in the number of potential citers, thus interacting more with the research papers. i.e. I, will indicate the extent to which, a research paper is getting into the eyes of the potential citer to be referred.

In Equ.(4) minus sign indicates that value of 'N_0' decrease as it encounters collisions with the research papers.

ASSUMPTIONS

A number of simplifications and assumptions have been made in the construction of this model. These are:

(i) Individual citers per year have been taken in place of number of citations per year. This is the novel feature of this model.

(ii) It is assumed that the collision of a potential citer with a research paper will result into scattering meaning incorporation of the research paper by the potential citer for the ready reference.

(iii) As normally the energy of electrons colliding with the lattice decreases with successive collisions, analogously, we assume that a saturation point of the potential citer reaches where it stops colliding with the research paper, taking care of the limitations of the potential citer to cite papers which is normally from 10 to 12.

(iv) The probability for a potential citer to collide with a particular research paper is very small because of the availability of large number of publications in the same field under study, the so-called "dilution effect".

(v) Here no allowance has been made for the fact that it takes some time before potential citers become aware of a paper. To compensate at least partially for this shortcoming we have taken a completely stochastic situation where any potential citer is free to interact with any research paper present in the system.

THE AIA OF INDIAN MAGNETIC RESONANCE PUBLICATIONS

The model so developed has been tested for publications, in the field of magnetic resonance, in India.

The AIA value of a publication is a weighted average number of individual citers per annum. In view of ageing effects, a weighting procedure has been preferred to a calculation of plain averages.

A ranking of Magnetic Resonance studies published during 1965-1970 is presented in the Table 1. The accuracy with which the significant differences between AIA values can be determined, depends in particular on the amount of data available, i.e. the number of years in which the citations of a paper have been recorded in the SCI. As publication data of research institutes are not always systematically recorded, there may be some deficiencies in the coverage. We estimate to have recorded more than 90% of all nuclear Magnetic Resonance papers by Indian physicists.

The graph gives the contribution of the work done by Indian authors in the subfield of physics, Nuclear Magnetic Resonance, quality-wise and quantity-wise during the period 1965-1970.

DISCUSSION OF THE DATA:

In the Table 1, the papers reporting Magnetic Resonance studies during 1965-1970 have been ranked. The sample contained about 47 papers dealing with magnetic resonance studies. In the lonely first position is a paper reporting work at Tata Institute of Fundamental Research by R Vijayaraghavan, S K Malik and VUS Rao, Phys. Rev. Lett 20 (1968) 106.

One is apt to conclude that the larger the impact of a paper, the higher the number of individual citers, and the wider the spread of the particular study. This phenomenon seems to be confirmed by the observations of Cole and Cole 1973), who remarked: "High-quality work done in one speciality is known to almost all physicists regardless of their speciality".

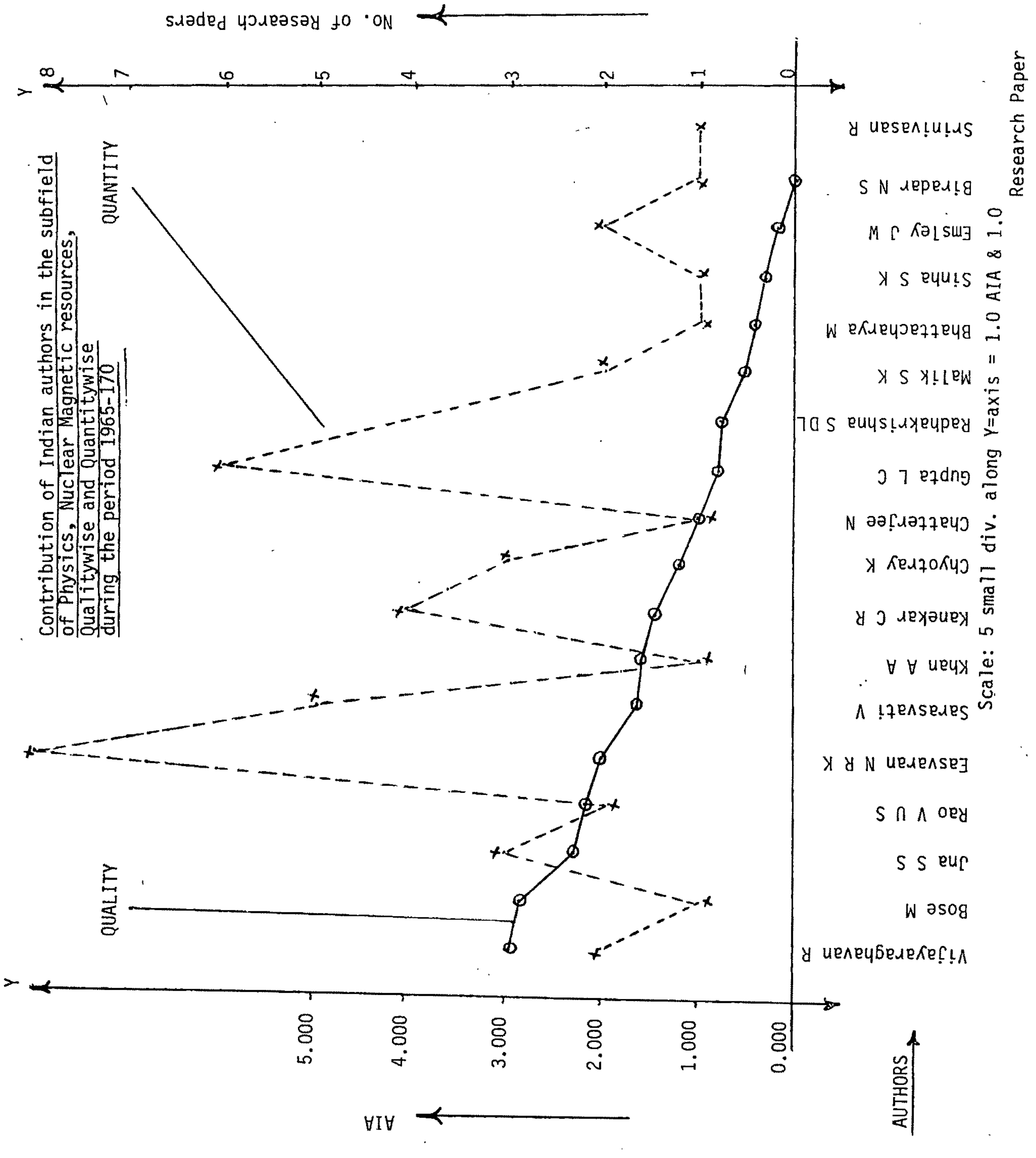
We see that the two curves (distributions) are entirely different from each other. The results of quality evaluation from our mode of analysis are quite different to what would have been calculated directly from the quantity of output. We see from our distribution graph that quality-wise Vijayaraghavan R stands on the top whereas quantity-wise Easwaran KRK tops the list. Research work to compare the efficiency and validity of this model with other similar models is under way.

TABLE - 1

PUBLICATIONS DEALING WITH NUCLEAR MAGNETIC RESONANCE STUDIES PUBLISHED DURING 1965-1970 RANKED ACCORDING TO AIA VALUE

AIA ranking	Authors	Nuclear Magnetic Resonance		AIA
1	VIJAYARAGHAVAN R	Phys Rev Lett.	20(1968) 106	2.992
2	BOSE M	J mol Spect	18(1965) 32	2.896
3	JHA S S	Nuov Cin B	53(1968) 120	2.331
4	RAO V U S	Phys Lett	19(1965) 168	2.183
5	EASVARAN K R K	Phys Lett A	25(1967) 683	2.006
6	SARASVATI V	Phys Lett (Netherland)	21(1966) 361	1.675
7	KHAN A A	Acta chem scand Series A	(1967) 63	1.617
8	EASVARAN K R K	J phys Soc.Japan	21(1966) 61	1.580
9	KANEKAR C R	Current Sci	34(1965) 557	1.439
10	SARASVATI V	J.Phys Chem Solids	28(1967)2111	1.379
11	CHOTRAY K	Phys Lett A	33(1970) 69	1.203
12	CHATTERJEE N	Mol Phys	12(1967) 341	1.040
13	SARASVATI V	J Phys Soc.Japan	21(1966) 74	0.949
14	GUPTA L C	Phys Lett A	28(1968) 187	0.793
15	RADHAKRISHANA S D L MASVAR A S K CR	Phys Rev	183(1969) 387	0.783
16	GUPTA L C	J Phys Soc Japan	27(1969)1229	0.742
17	EASVARAN K R K	Indian J pure appl phy	4(1966) 324	0.729
18	RAO V U S	J Phys Chem Solid	29(1968) 123	0.655
19	KANEKAR C R	J phys Chem	73(1969) 276	0.651
20	CHOTRAY K	Phys Lett A	83(1970) 217	0.634
21	VIJAYARAGHAVAN R	Appl Phys	39(1968)1066	0.605
22	EASVARAN K R K	J phys Soc Japan	21(1966)1614	0.552
23	MALIK S K	Phys Lett A	28(1969) 648	0.522
24	EASVARAN K R K	J chem Phys	45(1966) 403	0.520

25	GUPTA L C	Indian J pure appl Phys	8(1970)	754	0.479
26	BHATTACHARYA M	J phys Soc Japan	25(1968)	1731	0.419
27	RADHAKRISHNA S L L	J phys Soc Japan	24(1968)	722	0.419
28	JHA S S	J phys Soc Japan	21(1966)	42	0.395
29	EASVARAN K R K	J chem Phys	45(1966)	404	0.355
30	GUPTA L C	Phys Lett A	28(1968)	255	0.350
31	SINHA S K	Indian J Phys	41(1967)	453	0.306
32	GUPTA L C	J phys Soc Japan	26(1969)	1065	0.298
33	KANEKAR C R	Current Sci	35(1960)	459	0.233
34	GUPTA L C	Chem Phys Lett	4(1969)	263	0.217
35	CHOTRAY K	Phys Lett A	32(1970)	217	0.184
36	EMSLEY J V	J chem Sci	(1969)	434	0.174
37	EASVARAN K R K	Indian J pure appl Phys	5(1967)	220	0.168
38	KANEKAR C R	Current Sci	35(1966)	37	0.151
39	SARASVATI V	J phys Soc Japan	23(1967)	647	0.149
40	BIRADAR N S	Current Sci	35(1966)	385	0.000
41	EASVARAN K R K	Indian J pure appl Phys	6(1967)	220	0.000
42	EMSLEY J V	Mol Phys	11(1966)	437	0.000
43	JHA S S	J phys Soc of Japan	21(1966)	42	0.000
44	RADHAKRISHNA S D L	J Phys Chem Solids	27(1966)	1567	0.000
45	RADHAKRISHNA S D L	Proc phys Soc	90(1966)	495	0.000
46	SARASVATI V	Indian J pure appl Phys	4(1966)	453	0.000
47	SRINIVASAN R	J Sci WD	26(1967)	86	0.000


Contribution of Indian authors in the subfield of Physics, Nuclear Magnetic resources, Qualitywise and Quantitywise during the period 1965-170

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A CITATION ANALYSIS OF INTERNAL AND EXTERNAL CONNECTIONS OF A RESEARCH BRANCH: A CASE STUDY OF SOLAR ENERGY RESEARCH IN THE USSR

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Discusses the internal and external connections of a research speciality in a country by taking a case study of solar concentrator and collector research in the USSR. The various factors are identified, which assess the development of the speciality.

INTRODUCTION

Scientific papers are the end products of scientific research, just as products/processes are end products of technological developments. A scientific paper has many attributes. The most important being its links in a series of citations pertaining to the previous literature. These citations are provided for a number of reasons. Some of them are ethical and some are non-ethical. The dominant reason for citing references is that they provide identification of those earlier researchers whose concepts, methods and apparatus /1/, etc. have inspired and influenced the author, it also indicates the probability of a subject relationship between the two. It is also possible that these citations may indicate the linkages between various active groups and identify the invisible colleges in a speciality. It is, therefore, possible to analyse and measure the internal and external connections of a speciality or its segment within a country, the links of various groups in that speciality. It also indicates the mechanics of growth of a scientific speciality. In the present essay an attempt has been made to study the development of solar energy in the USSR through citation analysis.

DATA BASE & ITS CHARACTERISTICS

The present study consists of a sample of 181 papers on solar concentrators and collectors from the Russian journal 'Geliotekhnika", published during the ten year period 1965-74. This journal has been chosen particularly for the fact that it represents a comprehensive and important vehicle of research communication in the field of solar energy in the USSR. For the purpose of analytical convenience the citations of papers in the sample have been categorized as under:-

(i) All the papers published in the Russian journal are taken as a group and this group is denoted by 'GI'.

(ii) The citations of GI papers by the authors of GI group are denoted by GIC.

(iii) The citations external to GI but internal to the country to which the group being studied belongs are referred to as GKN.

(iv) The citations external to both GI and the country of the group being studied are referred to as GEE.

CHARACTERISTICS OF GROUP GI

There are certain characteristics of this group which have a vital impact on the number of linkages and their patterns. The sample chosen for study consists of papers both theoretical and applied in nature. Considering the institutional background of the authors of this group, it has been found that the majority of the papers (140) have emanated from only three institutions, and the rest are distributed among other eleven institutions. There are hardly a few instances where the papers of this group are produced through inter-institutional cooperation. The analysis of the authorship in group GI is presented in Table-I. It can be seen that a major portion of the members of the group GI are the products of team research.

TABLE - 1

AUTHORSHIP PATTERN

No. of Authors	No. of Papers
1	49
2	46
3	51
4	19
5	14
6	2
	181

LINKAGES

When a scientific paper refers to a previously published paper, a linkage or connection is said to have developed between the two. Study of linkages between research papers is very important, as it serves as a tool for evaluating them. Linkages may be internal or external. Internal linkages signify relationships between different research papers or members of the group. On the contrary, an external linkage signifies a relationship between any external member and a member of the group being considered. This external member can be from inside the country as well as from outside the country to which the group being studied belongs.

MEASUREMENT OF INTERNAL CONNECTIONS

Table-2 gives the frequency distribution of connections around each member of group GI. It would be evident that there are in all 499 internal linkages. Forty-three papers of group GI have been found to have Zero linkages or no linkages at all. Therefore, these 499 linkages are actually found to have developed among 137 papers. To find out the density of internal connection, it is useful to take a ratio between the actual sum of connections and the maximum possible sum of the linkages. The initial idea of measuring such a relationship through matrix analysis was proposed by Solla Price, [2 & 3] and was later on developed by a Japanese scientist Yagi Era [4], in close collaboration with Solla Price. The total possible number of linkages between 137 papers of group GI will be 9286*. Hence, the density of internal connections/linkages is = 537**. This means that there are on an average 5 linkages per paper in this group.

TABLE - 2

FREQUENCY DISTRIBUTION OF LINKAGES WITHIN GROUPS GI

No.of Times each paper is linked	No. of Papers	No. of Links
13	2	26
11	1	11
10	2	20
9	2	18
8	5	40
7	5	35
6	7	42
5	17	85
4	17	68
3	22	66
2	31	62
1	27	27
0	43	0
	181	499

MEASUREMENTS CONCERNING EXTERNAL CONNECTIONS

Table 3 gives statistics on the percentage of citations of group GEE in the total citations distribution of individual member of group GI. It is noticed that:-

(i) 54.1 percent of papers of group GI have zero percentage citations of group GEE.

(ii) 9.9 percent of papers of group GI has more than 50% of citations to group GEE.

---

* Total possible linkages

$$= \frac{n(n-1)}{2} = \frac{137 \times 136}{2}$$

** density of linkages is $\frac{499 \times 100}{9286}$

These observations give a broad indications of the impact of those papers which have been published outside the USSR on the group GI. It has been found that more than 50% of the members of the group GI have not been subjected to pressure external to the country. They have either done original research or have been influenced by ideas developed within the country. As against this, only a small percentage (around 10%) of the members of group GI have been influenced in a big way by the papers published outside the country. Only in 2 papers, the external influence was found to be total or complete.

TABLE - 3

PERCENTAGE DISTRIBUTION OF MEMBERS OF GEE IN TOTAL CITATIONS OF MEMBERS OF GROUP GI

No. of Papers of Group GI	Percentage Range of Citations of Group GEE in Group GI
98 *	0
7	0-10
26	11-20
9	21-30
11	31-40
14	41-50
7	51-60
4	61-70
2	71-80
2	81-90
2	91-100
181	

* This includes 10 papers which are original and does not cite any external paper

Table-4 provides the frequency distribution of external papers cited by group GI. The total number of such external papers is 455; of these 74 percent (336 papers) belong to group GEN and 26 percent (119 papers) to group GEE. A deeper scrutiny indicates that out of these 455 papers, 310 papers (i.e. about 69 percent) are cited only once and the rest (31 percent) are cited twice or more. It is generally assumed that good papers or important papers are cited several times, barring exceptional cases. So if a paper is cited twice or more the probability will be that it is an important paper for the group GI. This probability will increase as the frequency of citations received from the members of GI increases. We assume a certain standard that if a paper is cited four times or more it will be an important paper to the group GI. Now analysing these 115 papers cited twice or more, 21 papers are found to be cited four times or more. A chronological analysis of these 21 papers reveals that most of these papers pertain to the period 1954-1961. So it can be concluded that the basic foundation of the research in the area to which group GI belongs was laid internally in the country during the period 1954-61. This has been further confirmed by the context analysis of these 21 highly cited papers, which lends support to the hypothesis that these papers contain original ideas and basic development work which are duly acknowledged and improved upon by group GI.

TABLE - 4

FREQUENCY DISTRIBUTION OF EXTERNAL PAPERS

No.of Times each paper is cited.	No. of Papers		Total Citations.
	GEN	GEE	
27	1	-	27
14	1	-	14
11	1	-	11
10	1	-	10
8	1	-	8
7	2	1	21
6	3	2	30
5	2	1	15
4	4	2	24
3	16	5	63
2	39	23	124
1	225	85	310
	336	119	649

Table 5 provides the chronological distribution of external citations. The following observations emerge from these tables:

(i) Uptill 1955 there is a steady growth of external citations, but afterwards, there is a sudden increase in the growth rate. The possible reason for this is that around this period, the first international conference on solar energy was held. As a result, solar energy research and its applications received worldwide attention and governments in many countries started giving emphasis to this area. More publications came out as a result of large scale investment in R&D.

(ii) Looking at the papers in group GEN, one finds continuous growth upto 1969; thereafter the growth rate fell considerably. The possible explanation for this is that the areas of research pursued by group GI might have been national priority areas upto 1969, and later on national priorities might have changed, causing a sudden decrease in numbers of group GEN.

(iii) Analysing the citations received by group GEN, it is noticed that the external orientation was slowly and gradually built up upto 1964, and, therefore, there was a sudden reversal of trend. This might be due to the fact that the group of papers GI being studied might have become an advanced group, from the point of view of international standards, and after this period it might have branched off in those areas of research which had either regional bias or which were not pursued elsewhere in the world.

(iv) Analysing the citations in group GEN, there is an enormous jump in citations to papers after 1955. Several factors may be responsible for this. One of the important factors which contributed to this was the creation of VINITI, a National Documentation Centre in 1952. This Centre was responsible for bringing to the notice of Russian scientists world literature on scientific research by organising an effective abstracting service called "Referativnyi Zhurnal". Then there are political reasons too. After Stalin's era there was a definite relaxation of political barriers between the USSR and the Western World. As a result, international mobility of scientists increased and more Russian scientists started going abroad either under exchange programmes or to present papers at international conferences and symposia . Another factor is the language barrier. After this period, a national translation facility was available for translating foreign documents to the Russian scientists. A language-wise analysis of non-serial translated documents, indicate that 19 documents were translated; of these 17 were in English (13 American).

(v) Looking at the cited papers of GEN & GEE groups together one finds that the external orientation of GEE in proportion of GEN was building up upto 1950-54; later on this acquired greater dimensions upto 1964. Thereafter it started dropping. This indicates that during the period 1954-64, research done outside the country had played an important role in influencing the ideas of the members of group GI.

TABLE - 5

CHRONOLOGICAL DISTRIBUTION OF
EXTERNAL PAPERS

....

Period	No.of External Papers.		
	GEN	GEE	Total
1970-74	32	1	33
1965-69	121	24	145
1960-64	92	48	140
1955-59	53	36	89
1950-54	12	4	16
1945-49	16	3	19
1940-44	2	1	3
1935-39	7	1	8
1930-34	1	1	2
	336	119	455

Table 6 provides a countrywise distribution of papers of group GEE cited by group GI. It is noticed that a major portion of these papers belongs to the United States. On the other hand, if we look at the heavily cited papers of group GEE, they are found to be distributed between USA, France, UK and Canada. Here, three factors are very important, namely, objectives and aims of research, resources available at the disposal of the countries and accessibility to the information. We know that the major applications of solar energy research are in the field of space research, and United States is the country which is leading in space research. Secondly, USA has enormous resources at its disposal for investment in R&D. Thirdly, Russian scientists are assumed to have more accessibility to American literature because of political reasons of competition in research. This is also confirmed by analysis of translated items of Group GEN. Numberwise, citations to papers from USA occupy the first position. On the other hand, the qualitative papers from USA, UK, France and Canada occupy the same position.

TABLE - 6

COUNTRYWISE DISTRIBUTION OF PAPERS & CITATIONS OF GROUP GEE

Country	No.of Papers	No.of Citations
U.S.A.	87	105
France	10	20
UK	7	8
Japan	6	10
Germany	3	3
Canada	2	1
Australia	1	1
Israel	1	1
Italy	1	1
Algeria	1	1
	119	158

CONCLUSIONS

The brief study of the development of solar energy as an area of research in the U.S.S.R. through citation analysis leads us to the following conclusions:-

(i) It helps us to determine the influence and its pattern of both inside and outside research efforts and developments of Centres of Research;

(ii) It is also possible to identify the specific groups or clusters within a speciality that often refers to each other;

(iii) It is also possible to trace the developments internal to the area speciality.

(iv) The influence of social and political factors on the development of an area/speciality could also be discerned.

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READERS AND THEIR READING TRENDS IN THE BRITISH COUNCIL LIBRARY, DELHI

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To find out the reading trends of the readers of the British Council Library, Delhi, a survey was conducted taking the books borrowed during 28 January to 9 February 1980 on Mondays, Wednesdays, Fridays and Saturdays as a sample. Results of the survey have been presented with tables & charts. The survey indicates that the Library is functioning on the right course and effectively, and the students are the largest single group of users. However, there is strong discontent among all categories of borrowers about the modern fiction collection. It has been concluded that the survey will be most helpful in the future book selection policy of the Library.

INTRODUCTION

The British Council Library, Delhi will complete twentyfive years of its service in 1981. The scope and coverage of the library services as developed over the years was primarily to project British life and culture as presented through British publications and to support and supplement local library facilities. Its pattern of services is based on the British public library system. In a fast changing society a library has also to keep pace with these changes if it is expected to be effective. Any major change or development of existing services requires some evaluation of the present set up, the users, and their correlationship. For this purpose a library conducts some survey, and systematically evaluates its scope and purpose whenever it decides to make some major change/develop/introduce something new to its existing pattern of services. The Delhi library is no exception. It undertook several studies earlier at different stages and now has again reached a major cross-road.

This study is primarily to identify the categories of the users vis-a-vis their pattern of borrowing. The reason behind this is the recent changes in the Council's approach in providing information and library services only to the professionals, decision-makers and students of postgraduate and research levels. This major change in our target of reaching users-who matter most to the Council, unlike the earlier 'open-door' policy, required us to 'stop and go'-- hence the study.

SCOPE

The sample check of issue records i.e. items actually borrowed by each borrower against his respective background, profession and interests, as declared by him on the membership form, is compared to find the correlationship between the borrower's background/specialisation/profession and the type of books borrowed by him. Hopefully this should indicate how far our readers are using the library to meet their professional needs and for recreational reading.

Just by studying issue records it is not possible to divide accurately what constitutes 'professional' or recreational reading, since a student of literature will borrow standard works of fiction and similarly books on cookery may be borrowed by those for whom catering is a profession or a course of study. Or for that matter books on psychology may be recreational reading for an engineer.

Again, the Classes of the Dewey Decimal Classification scheme at times obscure as much as they reveal. For example, the 100 class covers psychology, philosophy and also topics like astrology and ghosts. If one breaks it down still further, the 630 section covers agriculture and also pets, similarly 740 covers engineering drawing as well as embroidery.

Similarly it is necessary to match each issue with the information about the borrower as given on the membership form. On the membership form, sample enclosed, the subject specialisation is taken as the major factor in most cases while matching with the subject of the books borrowed by the member. Where this was not adequate, combination of member's designation, official address, etc. were all found to be useful.

METHODOLOGY

The size of the sample was the total number of books borrowed by the members during 28 January-9 February 1980, on Mondays, Wednesdays, Fridays and Saturdays (8 days). This was not the total issue figure; it excludes postal, corporate and all types of special and inter-library loans. As our membership record file is arranged in numerical order, our first job was to tabulate the class number of every book borrowed and the corresponding membership number of the respective borrower on a card. These cards were then rearranged membership numberwise. Second stage was to note down the profession/choice of specialisation given/designation/category of student, etc. from the membership record file (see examples). This part of the job was most tiring and time consuming.

We have selected broad headings for membership categories (Appendix A).

1 students

2 teachers

3 foreigners

4 professional and

5 others

The students were subdivided into six separate groups and the teachers into two - (a) schools (b) college and university. Our purpose of bringing the foreigners as a separate category was to find out, perhaps the way they are using the library. Our emphasis on professionals was obvious. We have subdivided them into 26 sub-groups. Administrators (13) where some of them are truly professional but the rest are also grouped under this heading as details given by them on the membership forms reveal that most of them to be careerists in some form or the other. Their purpose of joining the library was presumably to get some material for improving their career either by preparing themselves for departmental tests or appearing for some competitive examinations. The location of the library is also a factor for us to choose them as a separate category under the heading 'professionals'. They are sub-grouped into six broad sections depending upon the type of organisation they serve and their individual rank in the organisation - senior or junior.

28 January 1980

F823.91

F (Female) 67236
(membership no.)

S U G.
(student under-graduate)

2 February 1980

616.3

M (Male) 65431
(membership no.)

S P G
(student-postgraduate)

8 February 1980

330.4

M (Male) 48991
(membership no.)

P A F Eng. Litr.
(Professional- Armed Forces)

The terminologies or trade names used in grouping the professionals are more of a popular nature and commonly used by the library. For example we separated technologists from technicians by their academic-cum-training background. The technologists are graduates and technicians are those who got into the trade by work experience and/or polytechnic training. The fifth category - 'Others' - include retired personnel, housewives and, the rest - members whom we were unable to post under any of the above categories.

Similarly the whole subject field was divided into 33 broad D.C. groups with slight adjustments to bring correlated topics together, as reflected in their use by the various categories of borrowers. We felt this was the most convenient arrangement we could adopt as reflected by the borrowing patterns of the library.

SOME LIMITATIONS OF THE STUDY

The scope and methodology adopted for this study at a very short notice may not help us in drawing bold conclusions but its value is no doubt useful to get some broad ideas on the trends of library use. One major disadvantage of our study is that the period covered is fairly short compared to the total number of open days (8 days out of 300) in a year and particularly the month of February is not ideal as it is one of the leanest months for the library. The normal loan period is one month. It is less than likely that some of the members could have visited the library and borrowed more than once during these eight days. This may not indicate the usual borrowing trends of each member in terms of his choice of subjects/topics.

Again it is worth noting that members do not always borrow books only for their own use but also for other family members, colleagues and friends. We should give some weightage to this factor in Delhi BCD library which is surrounded by Government offices and the library working hours suit their timings. Needless to note that a library visitor tends to borrow 'something', which might have been found just by accident on the shelves, when a specific title of his choice was not readily available. A regular borrower with professional background may have various obvious reasons for borrowing something not closely relevant to his professional interest e.g. a chartered accountant may have a hobby as an amateur photographer or a painter in his spare time could be a keen student of English literature.

DATA ANALYSIS

1 Our main table (Table 1) indicates the issue figures distributed over 33 broad D.C. subject groups against the total borrowers classed into 44 different categories.

2 Total number of borrowers was 2774 (1582 - first week; 1192 - second week). They borrowed 6594 volumes between them i.e. on an average each borrower had 2.4 volumes on loan. Distribution of male : female borrower is 3 : 1 (2140 male and 654 female members).

3 Average daily borrowers : 2774 ÷ 8 = 347 (approx) and average daily issue figure 6594 ÷ 8 = 824 (approx). These figures exclude other visitors to the library and reading room users, corporate, postal and all special categories.

4 Heavily Borrowed Sections of the Stock (First 10). See Chart 1 & Table 3.

Modern Fiction (Chart II)

Modern Fiction (MF) issues are the highest 1407 i.e. 22% against a stock size of 7528 (10.7%)of the total stock of 70673 as on 31.3.79). This also indicates that all the borrowers on an average do not borrow fiction. Fiction issues is 1 in 5. A member is allowed to borrow four books. The heaviest users of Modern Fiction are senior civil servants whose places of working are located in the neighbourhood of the library. They borrowed 155 out of 1407 (11%) issued during the period. They are followed by the Housewives, Others, Retired Personnel and Secondary School Students, in that order. The school students borrow fiction a great deal. They belong to the age group who enjoy suspense and thrillers most. Among the professionals, Engineers (133 come at the top of the list and are placed half way on the Modern Fiction chart (roughly 85 out of 329 books they borrowed), whereas 93 Housewives borrowed 119 MF out of 255. Undergraduate students - SUG and SVO (undergraduate students of Engineering, Medicine, etc) also borrowed MF quite regularly, perhaps to have a 'break' in their study.

Classics (CF) of English literature is not so popular (only 62 borrowings) except perhaps amongst the students. This section is worth maintaining to support our English literature collection which is the second heavily used section of the library (perhaps one set of single copies only).

5 Borrowers by Categories

As a single category of borrowers the Senior School Students top the list (883). Again the students as a group, all categories, together take the lion's share of books issued - 2549 out of a total of 6594 (39%). Incidentally 38% of our total membership also belongs to this category. The second place is taken by the Government of India employees (PAGS - 535 and PAGJ - 430). Engineers and doctors have also borrowed fairly heavily (PEN - 329, PMN - 228). Journalists (PJO - 157) also use the library fairly well. The location of offices of the IENS (Indian and Eastern Newspapers Society) members in the neighbourhood has influenced this figure. Non-Diplomat Foreigners (38) used the library more effectively (94 borrowings)

CHART - I

Heavily Borrowed Sections

[above 200]

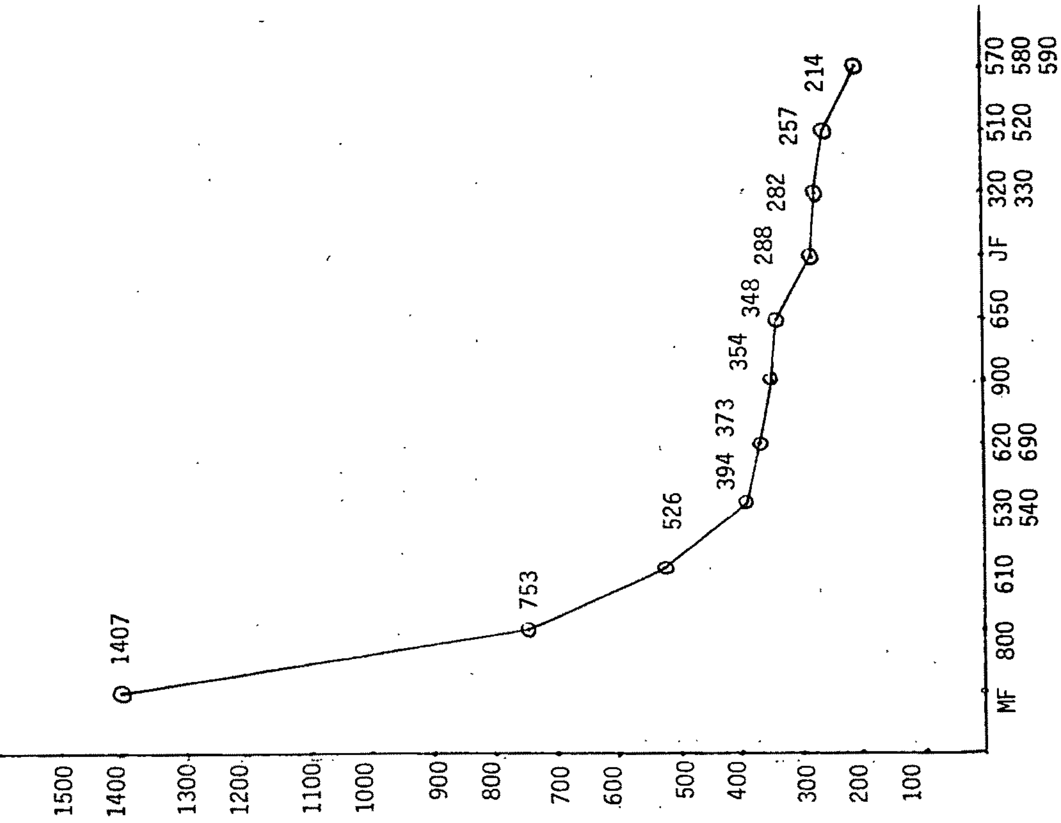


CHART - II

Heavy Users of Modern Fiction

[Top 10]

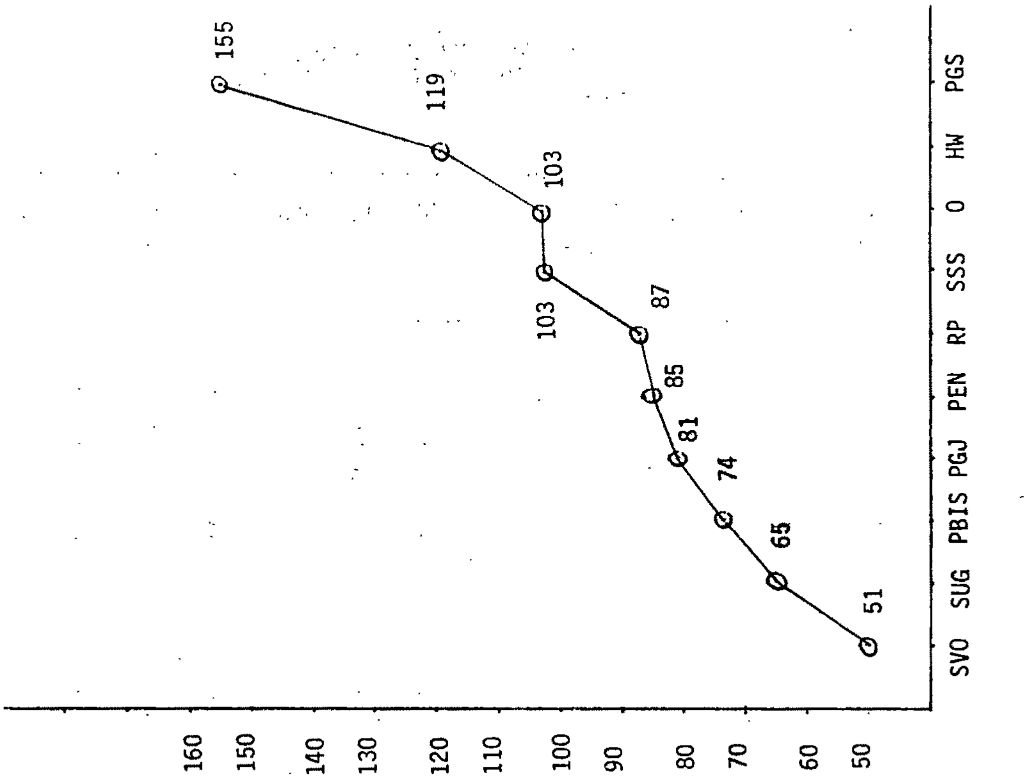


TABLE - I

ISSUE FIGURES ACCORDING TO DC SUBJECT GROUPS & VERSUS BORROWING GROUPS

MEMBERSHIP CATEGORIES	Number of BORROWERS	000	020	070	Rest of 000	100s	130 150	200	300 360 390	320 330	340	370	380	400	500 550 560	510 520
SSJ	58	-	-	-	-	-	-	-	6	2	4	-	3	-	-	2
SSS	349	-	1	-	-	1	4	2	9	22	4	-	1	6	15	104
SUG	294	2	-	-	-	5	4	4	8	55	2	2	1	4	12	24
SPG	119	1	4	-	-	2	6	2	3	40	1	3	-	-	-	2
SVo	241	1	-	2	-	3	5	3	11	9	17	1	4	18	3	12
SR	23	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-
TS	37	-	-	1	-	1	-	-	1	4	1	4	-	1	-	7
TCU	71	1	-	-	-	2	-	-	4	6	2	4	1	10	1	7
FD	3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
FND	38	-	-	-	-	-	-	-	1	-	-	-	-	1	-	2
PEn	133	-	-	-	-	1	3	-	1	12	1	-	1	-	4	7
PLa	7	-	-	-	-	-	-	-	3	-	2	-	-	-	-	-
PSc	19	-	-	1	-	-	-	-	2	4	-	-	-	2	-	-
PTe	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLib	10	1	1	-	-	-	-	-	2	-	-	-	-	-	-	-
PBr	13	-	-	1	-	-	2	-	2	2	-	-	-	2	-	-
PJo	66	-	-	2	1	-	-	2	5	5	-	1	3	1	1	4
PPo	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PT	15	-	-	-	-	-	-	1	-	-	2	-	-	-	-	1
PSW	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAM	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC/PTO	12	-	-	-	-	-	1	-	-	-	-	1	-	1	-	1
PAGS	238	1	-	-	-	11	8	4	11	40	6	4	6	9	5	13
PAGJ	206	4	-	-	-	4	6	4	12	27	7	1	8	10	1	26
PBIS	66	3	-	-	-	1	1	3	3	4	-	-	-	4	-	6
PBIJ	86	2	-	-	-	3	1	2	7	8	4	2	-	4	1	5
PAAS	21	2	-	1	-	-	-	1	-	3	-	-	-	-	-	2
PAAJ	31	-	-	-	-	-	-	-	1	-	-	-	1	1	1	3
PSo	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PEd	8	-	1	-	-	-	-	-	1	-	-	-	-	2	-	-
PPub	8	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
PAP	6	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
PMN	80	-	-	-	-	-	6	-	1	-	-	-	-	-	-	1
PPM	7	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
PAc	39	1	-	-	-	1	-	-	3	7	4	-	-	-	-	2
PBa	54	-	-	-	-	-	3	-	3	12	4	1	1	-	2	1
PAr	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PTT	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAF	29	-	-	-	-	-	1	-	1	1	-	4	-	-	1	3
PReL	1	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
PSe	26	-	1	-	-	1	-	-	2	2	-	-	-	-	-	3
RP	72	-	-	-	-	4	-	2	7	6	1	2	-	5	-	4
HW	93	1	-	-	-	2	-	3	3	2	-	-	1	1	-	3
OTH	135	-	5	-	2	3	4	6	15	8	3	2	-	1	3	12
Total	2774	21	13	8	3	45	57	42	128	282	67	32	31	85	54	257

READING TRENDS IN THE BRITISH COUNCIL LIBRARY, DELHI

530 540	570 580 590	600 660 670 680	610	620 690	630	640	650 350	700 710 720	730 740 750 760	770 780	790	800	900	JF	JNF	CF	MF	Total
2	1	1	6	7	1	-	4	-	-	-	10	6	4	53	18	1	37	168
185	59	4	56	37	6	6	38	4	11	9	37	56	48	33	17	5	103	883
56	33	-	38	26	1	2	33	3	8	1	9	169	45	9	5	6	65	632
18	4	-	11	2	-	2	10	1	5	3	1	107	11	1	4	4	25	273
13	6	7	127	73	1	12	56	10	11	5	20	24	6	3	14	2	51	530
-	5	-	6	2	2	-	1	-	-	-	2	16	5	1	-	1	19	63
7	-	1	2	2	1	3	5	2	2	-	9	14	6	2	7	2	22	107
18	2	-	8	5	3	-	-	1	4	-	1	45	11	7	2	-	36	181
-	-	-	-	1	-	-	-	-	-	2	-	-	4	-	-	-	-	9
-	1	-	4	-	1	2	1	4	3	-	2	11	8	21	-	1	31	94
9	10	3	16	79	3	8	17	1	2	5	8	20	10	10	12	1	85	329
-	6	-	3	-	-	-	-	-	-	-	1	7	2	-	-	-	1	25
5	2	1	3	5	-	-	2	-	1	-	3	6	-	2	1	-	12	52
1	2	2	4	-	1	-	2	-	-	-	-	-	1	-	-	-	6	20
-	-	-	-	1	-	-	-	2	-	-	-	6	1	-	-	-	7	21
-	-	-	1	3	-	-	1	-	-	-	2	1	3	1	-	-	1	22
2	2	-	4	3	3	-	8	2	4	-	2	36	16	4	1	3	42	157
-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	4
-	1	-	-	8	-	-	-	1	3	1	1	6	-	-	1	1	5	32
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	4	5
-	1	-	-	-	-	-	-	-	8	4	-	1	-	2	-	-	3	19
-	-	-	2	2	-	10	1	-	-	-	1	1	1	-	1	-	-	23
21	10	1	4	13	7	5	40	4	6	4	12	40	34	37	18	6	155	535
18	16	-	22	30	-	4	23	3	8	4	2	32	33	17	17	10	81	430
1	5	1	2	22	-	6	16	2	2	-	6	7	4	4	-	1	74	178
6	10	7	9	4	3	1	17	1	2	1	8	10	8	13	4	-	43	186
1	3	1	2	-	-	3	11	1	2	-	1	4	5	2	2	-	15	62
2	1	2	3	-	2	3	13	3	3	7	5	9	9	3	-	1	11	84
-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	3	5
-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	1	4	17
-	-	-	-	-	-	2	1	-	-	-	4	-	-	1	-	-	13	24
-	1	-	-	-	-	-	-	-	-	-	2	1	3	1	1	-	3	13
-	11	-	141	3	-	1	1	-	1	4	2	3	2	15	3	-	33	228
-	1	1	2	-	3	-	-	-	-	-	-	1	-	2	2	-	2	15
4	4	-	6	2	1	2	6	-	-	-	4	8	7	1	3	4	25	95
1	1	-	5	7	-	1	13	-	6	-	1	10	11	3	5	3	24	118
2	-	-	2	4	-	1	-	9	-	-	1	-	-	-	-	-	9	28
-	-	-	3	3	1	1	-	4	1	-	-	-	7	4	2	-	15	41
1	1	-	15	8	-	2	4	-	1	-	1	9	4	2	2	1	17	79
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	[illegible]	5
3	-	2	4	4	1	-	2	1	-	-	-	6	4	-	1	1	16	54
5	3	-	1	3	-	-	5	3	1	3	5	26	16	-	2	1	87	192
2	4	2	6	6	3	7	3	3	9	1	7	26	10	22	9	-	119	255
11	8	-	8	8	-	2	14	6	8	2	15	21	14	6	5	6	103	301
394	214	36	526	373	44	87	348	71	112	56	185	753	354	288	159	62	1407	6594

than the Diplomats (3) who borrowed only 9 books during the same period.

6 Type of Borrowers

Total number of borrowers during this period was 2774. Senior School Students (349) is the largest single group followed by undergraduate students, students of vocational courses, and senior civil servants, in that order. At the bottom of the ladder is one clergyman (PRe - 1 who was allowed to borrow one book extra as a special case and a sole politician - PPO - 1). The top twenty groups of borrowers are shown in Table 2 and Chart III. Naturally these groups have also borrowed the highest number of books.

7 Least Used Sections - See Chart IV

We took 100 as the cut-off point of the total issue under various subject groups and found 17 subject groups out of 33 broad groups, are the lowest used sections.

As was expected DC Section 000 is least used (including librarianship stock : 414 volumes, journalism and computer science). We consider these subject groups need continued maintenance and development as the relevant users groups, though small, are useful targets.

Our stock on the Class 400 (i.e. 420 mostly) are on teaching English as a secondary language at primary and secondary school levels. As plenty of Indian publications, including NCERT published textbooks, are available at a very reasonable price we may not expect more than what we have achieved in this area. Also extra "Readers" are kept with the Junior Collection though BNB puts them in 420 class.

640 section is used by the Housewives and the students of Hotel and Catering Management institutions. Engineers and Government of India employees may have borrowed books from this section for their family members.

We expected a better use of our Classics (CF) section.

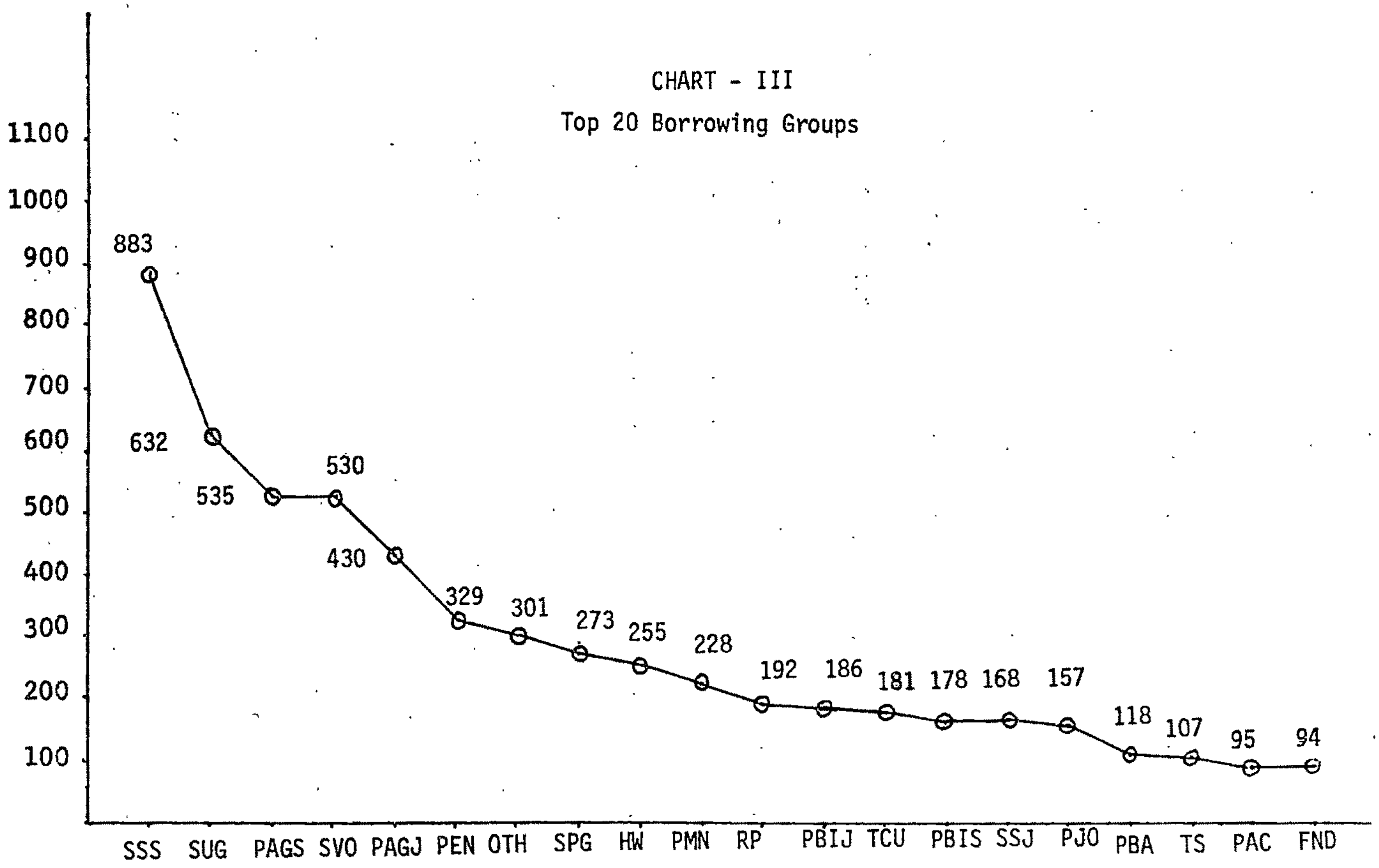


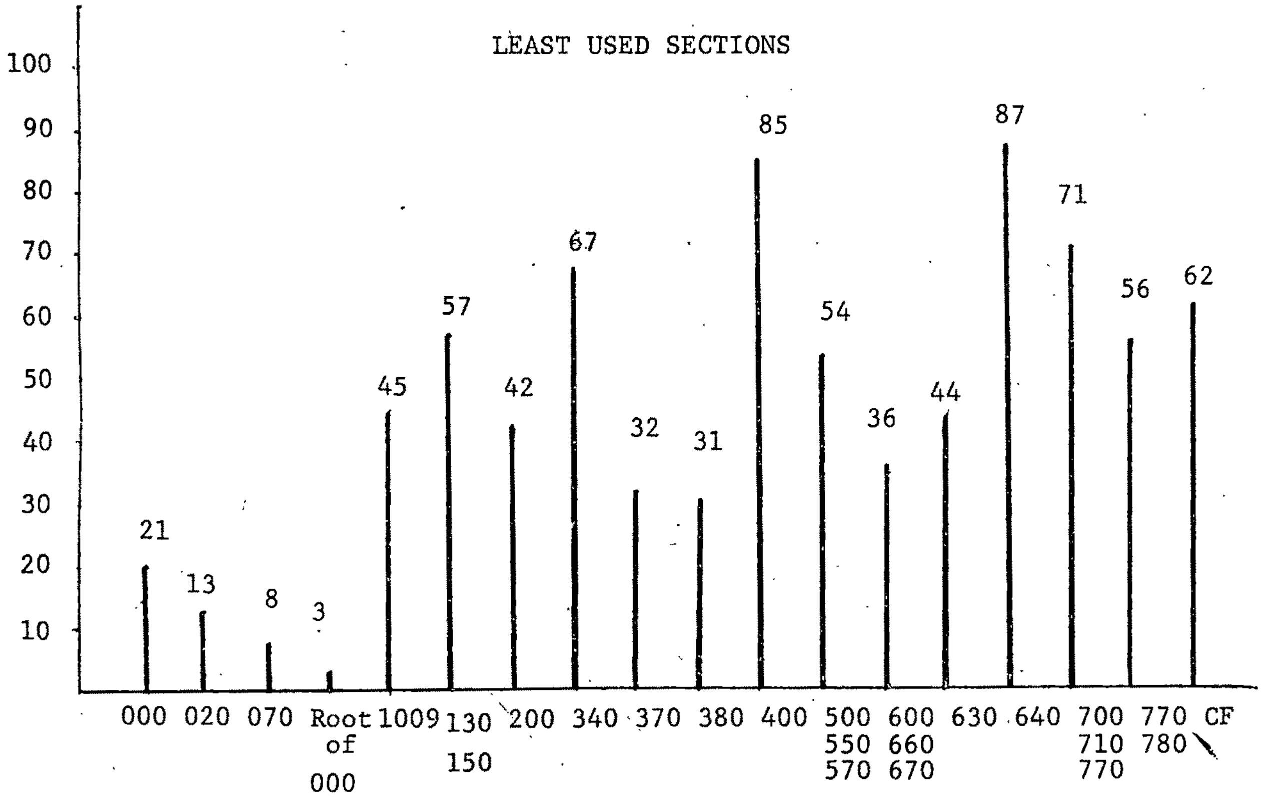
CHART - III

Top 20 Borrowing Groups

Table 2 - Showing the top twenty borrowing groups

Categories of Borrowers	No of Borrowers	Books Borrowed	Categories of Borrowers	No of Borrowers	Books Borrowed
SSS	349	883	PMN	80	228
SUG	294	632	RP	72	192
SVO	241	530	TCU	71	181
PAGS	238	535	PJO	66	157
PAGJ	206	430	PBIS	66	186
OTH	135	301	SSJ	58	168
PEN	133	329	PBA	54	118
SPG	119	273	PAC	39	95
HW	93	255	FND	38	94
PBIJ	86	186	TS	37	107

CHART - IV


LEAST USED SECTIONS

The remaining sections that are not well used reflects our policy of maintaining smaller stocks in these sections.

8 Smallest Groups of Borrowers - See Chart V

Among the groups of borrowers that visited the library and borrowed books during the study period there were 18 groups, out of a total of 44 groups, whose strength did not reach even to 20, the cut-off point. Relevant figures of books borrowed by each of these smaller groups are given in Chart V - which indicates this low trend. But one thing is clear - most of the professional groups have been borrowing books from the corresponding sections of interest though most of them do also borrow titles on Modern Fiction.

9 The bulk of our junior collection borrowings is by the primary and secondary schools as corporate members, but these figures (Junior Fiction and Junior Non-Fiction) only relate to books borrowed across the counter by the local individual members. Total issue from this section is 447 (JF - 228; JNF - 159) which is comparatively small (6.75% of the total issue figure). As was expected the major groups of borrowers of this collection are individual school students (SSJ and SSS) and the housewives (HW). The government employees (PAGS, PAGJ) also borrow from this section for their children. Between them the figure accounts for 20% of the total JF & JNF issue. Members with professional background have also been regularly using this section (engineers PEN and doctors PMN). The non-diplomat foreigners FND depend on our collection for extra-reading material for their children. These strong pressure groups have all along been appreciating our Children's collection and now are resentful at having to accept the gradual withdrawal of this useful collection.

10 Section 900 - History, Biography, Travel

History has always been popular with the members. 354 volumes were borrowed by all sections of our membership - students, government employees as well as professionals and housewives. Perhaps it is worth noting here that biographies of professionals and subject specialists are put with respective subjects rather than under 920.

11 Literature - 800

Literature is the most heavily used section in the library next only to modern fiction. Undergraduate, postgraduate students and teachers, research scholars heavily depend on our collection. Out of 753 volumes issued, 375 volumes (50%) were borrowed by them. Again, this section is evenly used by all types of members. If we leave aside the actual textbooks, we found during a recent check that both undergraduate (honours level) and postgraduate students frequently borrowed the same

CHART - V

Smallest Groups of Borrowers

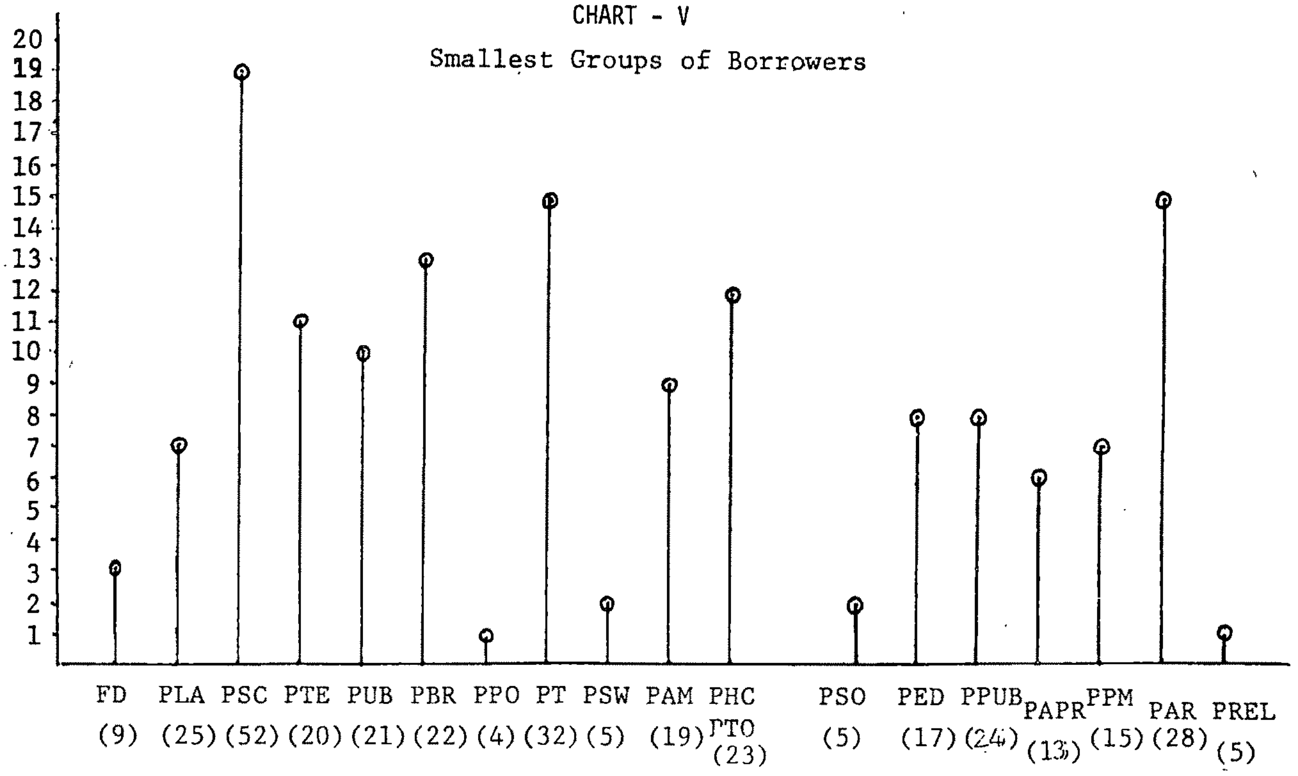


TABLE - III

PERCENTAGE OF STOCK & ISSUE UNDER 13 BROAD SECTIONS:

CLASS	STOCK %	ISSUE: 28 Jan-9 Feb '80 %
000	3.44	0.68
100	1.39	1.56
200	0.35	0.63
300	14.4	8.91
400	3.03	1.28
500	9.38	13.93
600	12.21	12.73
M	7.81	7.97
700	5.69	6.43
800	14.15	11.41
900	4.83	5.36
F	10.69	22.27
JF JNF	12.55	6.77
Total	70,824	6,594

titles. This indicates that there is no such hard and fast dividing line between undergraduate level and postgraduate level collections. This collection is fairly rich and we should try to develop it in a more systematic way viz. by cutting down multiple copies we can try to make the collection more comprehensive by filling the gaps and adding recent standard publications.

12 Science and Technology

In general some groups of users normally borrow books both from 500 and 600 sections. Hence we thought it would be proper to group them together for this study. From 600 section we have excluded 610(medicine) and 650/350 Management and Public Administration which will be dealt separately. Total number of books issued from 600 section is 540 (nearly 9% of the total issue). And the number of books issued from 500 section is 919(nearly 14% of total issue) which is next only to modern fiction section. If these two figures of 500 and 600 sections (including medicine) are combined together the total comes to (919 + 540 + 526) = 1985 i.e. nearly 30% of the total issue.

The students again are the largest groups of users. Students of vocational courses which cover engineering and other applied sciences find this section useful. Similarly all the various professional groups - Engineers, Technicians borrow from these sections. The administrators (PAGS, PAGJ, etc.) perhaps borrow from this section for their own use and also for others.

These sections need to be developed and kept up to date. Books published on science and technology are more expensive and they also go out of date very quickly. Another important point in properly developing this collection is that a large number of titles are American publications. Some decision is to be taken on the cost of books and place of publication factors fairly soon to bring up this section above postgraduate level. The demand on these sections will continue to increase.

13 The library has all along been popular for its MEDICAL collection. Earlier it was the Council's policy to maintain a representative collection of British medical publications to support both teaching faculties and the practising doctors as the British health services used to recruit a good many Indian doctors. Things have changed now. Moreover, medical publications have become most expensive and

lot of them are published from USA. This has created a major problem in keeping this collection both representative and up-to-date. This is why Delhi library has been recently obtaining medical publications on a selective basis. Even then both students - undergraduate and postgraduate - and practising doctors extensively use our library. Out of a total of 2774 borrowers there are 80 doctors and 7 para-medical professionals who borrowed 243 volumes (228+15) out of which 143 (141+2) vols are only from our medical collection and 12 on biological science. SVO (students of vocational studies) and SUG and SPG (includes medical students), have borrowed 171 volumes (122+38+11). Senior secondary school students who had taken medicine as a special paper and ultimately hope to join the medical schools borrowed 56 vols. Total number of books borrowed from this section is 526 (stock size - 4053). They have also borrowed a big chunk of 214 volumes that went out on loan from the biological sciences section. These figures clearly indicate that doctors are using this library to meet mostly, needs of their professional interest.

14 Management and Administration

Demand on this section is a recent one in Delhi library. Once we took the initiative in building up a sizeable representative stock, we started getting the users. Though it is a difficult proposition to maintain an uptodate collection - first because much of the useful literature is American, secondly, articles, report literature and AV material are essential to supplement book stock - we wish to maintain a fairly advanced and useful stock to meet the demands of administrators and senior and junior executives from both public and private sectors. 348 volumes were issued out of 2460 volumes in stock. Administrators groups are, as expected, the major users though they have borrowed books on all subjects. This again is also expected from the policy makers.'

15 Social Sciences

Economics, political science, international relations are very popular among the students, administrators. 282 volumes were issued out from these sections. In terms of cost of publication it is very difficult to keep an uptodate representative collection on economic and political science. A fairly representative collection is to be maintained if the library is to provide an effective service to the decision makers. Books on education are not greatly in demand in the library. Over a period of years this section was built up with a sizeable stock (1760) as advised by the Education Unit. Unfortunately this did not pay at all. We now add books on education at low priority.

Maintaining a good law library is a stupendous task, especially when it is part of a general library collection. We felt there are demands on our law collection but we are unable to keep it up-to-date because of the heavy cost. Again maintaining a stock of Law monographs is not enough without Digests, Reports and Periodicals. We are trying to maintain a collection of standard works only.

Other topics covered within D.C. 300 are not in much demand as most of them deal with British social systems. Except the standard works and books on social thought there may be much demand of material by our users.

CONCLUSION

This study was undertaken at a point when things had already started changing in terms of library resources, membership, and services. Whereas the results again proved that the library was functioning on the right course and fairly effectively by providing a service of high standard. But there is no denying that it can be improved. We accept that we must make some move with our now limited resources in a way so that we are more effective to our target groups of users as far as their needs of information are concerned. Our problem still lies in properly defining our user groups. The study clearly indicates students are our largest single group of users. We must not keep them on our door steps only. By not allowing undergraduates we may not be able to reach the postgraduates as they are likely to keep themselves away from the library.

There is recently strong discontent among the borrowers from all categories that we are not maintaining our MF collection properly. This is true.

By maintaining a smaller collection of MF with only standard literary works that we are receiving, complaints are being made that BCD is trying to 'educate' the users. Whereas all of them including the top bureaucrats and senior professionals want to read 'something'. They want 'suspense', 'thrillers', and other light reading material when they are not under pressure to consult/read other 'heavy' stuff. Unfortunately library space and book fund are two major hurdles to satisfy these groups of our users. Similar views are also expressed on our children's collection.

This study will be most helpful in our future book selection policy. But it may not necessarily help us to bring the groups of users that BCD wishes to cater to most.

It goes without saying that we should be able to generate more useful management information by further analysing the survey data, portrayed on the charts and tables, in various ways.

APPENDIX A

BRITISH COUNCIL LIBRARY, NEW DELHI - CATEGORIES OF USERS

I	Students	1. Junior School	SSJ
		2. Senior School	SSS
		3. Undergraduates	SUG
		4. Postgraduates	SPG
		5. Vocational Studies	SVo
		6. Researchers	SR
II	Teachers	1. School	TS
		2. College & University	TCU
III	Foreigners	1. Diplomats	FD
		2. Non-diplomats	FND
IV	Professionals	1. Engineers	PEn
		2. Lawyers	PLa
		3. Scientists	PSc
		4. Technologists	PTe
		5. Librarians	PLib
		6. Broadcasting	PBr
		7. Journalists	PJo
		8. Politicians	PPo
		9. Technicians	PT
		10. Social Workers	PSW
		11. Arts & Music	PAM
		12. Hotel and Catering/Tourism	PHC/PTO
		13. Administrators	
		a. Government - Senior level	PAGS
		b. Government - Junior level	PAGJ
		c. Business and Industry - Senior level	PBIS
		d. Business and Industry - Junior level	PBIJ
		e. Autonomous Bodies - Senior level	PAAS
		f. Autonomous Bodies - Junior level	PAAJ
		14. Sociologists/Social Scientists	PSO
		15. Educationists	PEd
		16. Publishers & Book Trade	PPub
		17. Advertising & Public Relations	PAP
		18. Medicine and Nursing	PMN
		19. Paramedical Services	PPM
		20. Accountants	PAC
		21. Banking	PBa
		22. Architects	PAr
		23. Travel and Transport	PTT
		24. Armed Forces	PAF
		25. Religion	PRel
		26. Self-employed Persons	PSe
V	Others	1. Retired Pensioners	RP
		2. Housewives	HW
		3. Others	OTH

Annals of Library Science and Documentation
1980, 27(1-4), 78-89.

PATENT AS A SOURCE OF INFORMATION

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Volume of patent literature being generated in the world; characteristics of patent information; patentability; patentese; tools for searching of patents; objectives and services of organisations like WIPO, ICIREPAT, INPADOC have been described.

Research scientists, engineers, technologists, librarians and information scientists have a tendency to overlook patents as source of information. Perhaps,it is because an individual patent appears to be dealing on a very highly specialised area, and written in a repugnant legal language. One has also a feeling that patents are not easily accessible. All these fears are unreal to a certain extent.

Patents are agreements between a national government and inventors whereby an inventor discloses his invention to public in exchange of an exclusive right of exploitation for fixed period (fourteen years in India now).

VOLUME OF PATENTS

The prosperity of a nation is in a way measured or reflected in its patent literature. The examples of Japan and Federal Republic of Germany can be quoted in this connection. There are varying estimates about the volume of patent literature as information sources. The variation of estimates ranges from 5% to 33.3% of total volume of literature. WIPO (1) has recently estimated (1980) that the world volume of patent documents has reached a figure of approximately 27 million, and grows at the rate of one million (nearly 3.7%) per annum. These one million patents relate to some 350,000 different inventions. Approximately 80% of patent documents are published in the following 13 countries.

	Countries	No. of Patents
1.	Japan	300,000
2.	Fed.Rep.Germany	134,000
3.	France	70,000
4.	USA	70,000
5.	USSR	45,000
6.	UK	45,000
7.	Netherlands	26,000
8.	Australia	25,000
9.	Italy	25,000
10.	Spain	22,000
11.	Canada	20,000
12.	Switzerland	4,000
13.	India	3,000

India has been publishing since 1912 about 3,000 patents per annum. The present stock of Indian patents is around 150,000 i.e. total stock of Indian patents from 1912 equals approximately only about six months' output of Japan in patent documents.

CHARACTERISTICS OF PATENT INFORMATION

It has become an integral part of scientific and technological information. A survey of patents indicates that they give us not only records of past and present inventions but also point towards future trends of technological progress when projected. The special features of patents have been summarised by Sviridov as below (1).

1. They contain technological information which will not be found in any other source. Independent studies have established that only 5-10% of technological information contained in patents find their way into other sources of information.

2. They disclose information not only on general utility of the invention but also on practical application of the invention in, for example,industry.

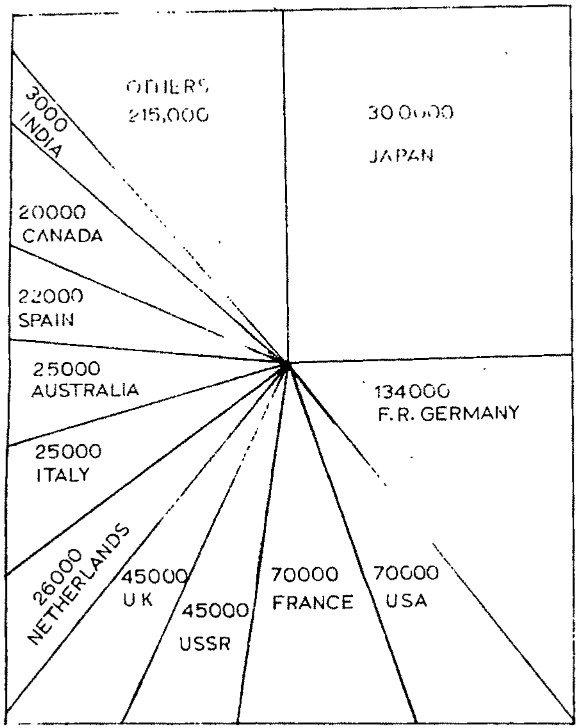


Fig.1 Patent Output
(1 million per annum)

3. They give, in addition to a statement of the invention, some background material.

4. They reveal information on specific technological items earlier and more completely than other sources do.

5. They obviate many times the need for translation of records of information from one language to another because the inventor has already done for putting his claim.

We may elaborate the points given above.

1. *Only Source of Information*

The normal sources of scientific and technical literature, apart from patent literature, are books and periodicals, articles, reports in which many aspects of scientific data and their interpretation are discussed. Most of these refer to accepted data or at least those of general interest. Publishers accept papers of such general nature only because they are operated in commercial environment. An abstruse item of invention or novel idea may not be acceptable to them unless the same is presented in the way they want it. They would want to slash heavily parts of drawings, etc. because they occupy considerable space available to them. But an inventor has to give complete details and examples as far as he can, to establish his claim. There are quite a few voluminous examples which could not have found publishers. The British patent, No. 749836 on a computing device has 267 printed pages plus 780 drawings. Another British patent, No.1,108, 800 on a similar subject, had to be bound in three volumes all costing only 25 pence (now 33 pence). Surely these contain enormous information which can't be found anywhere else.

2. *Early Information*

The fact that an inventor wants to exploit his idea before any one else, makes the patent document earliest source of information. Sometimes, the invention as it stands is not economical to exploit at a particular stage of time and hence it does not get published in any other source. But once the snag is removed, it becomes economical. Even highly profitable patent specifications are known to have gone without the conventional literary exposition for a long period after the patent was taken.

For example:

Hollerith's patent on punched cards and machines for processing the same was taken in 1889, but no literature was noticed till 1914 (a period of 25 years). To-day punched cards are very important and voluminous literature has come out on the subject.

Secondly, Watson Watt's patent of 1936 on radar, which no doubt was subject to secrecy regulations during war, did not find its way out in conventional document world till much later after the war. But still, a copy of the patent could be bought in the patent office.

A third example could be quoted in Whittle's patent on jet engines dated 1930, which did not have its veil removed through literary expositions for a long period.

The other characteristics of patents are self-explanatory as given in the points above.

PATENTABILITY

There are certain terms used in connection with patents. It is necessary to be clear in our mind about the distinctions of these words for clear understanding. These are: knowledge, discovery, invention, and innovation. Whether or not they are patentable is given in the chart. It is generally understood that an invention has to be a novelty in order that it may be patent-

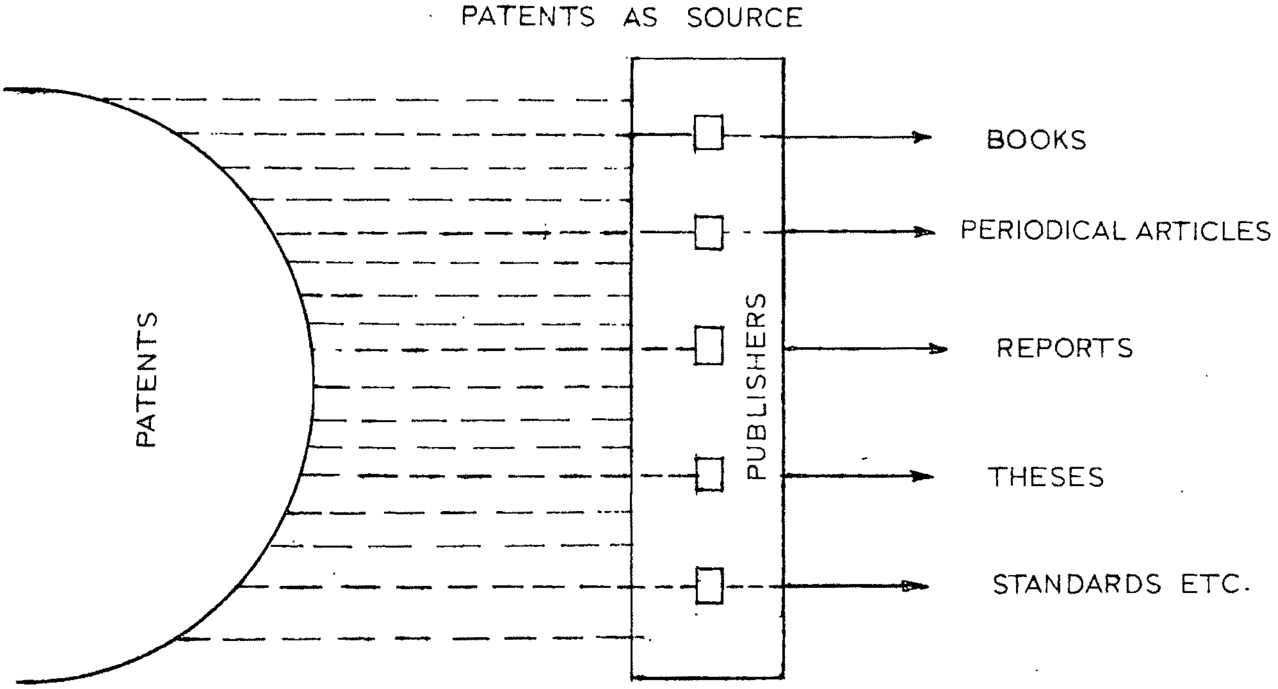


Fig.2 Patents as Source

able. Some general tests that the legal authorities perform to determine whether an invention is patentable or not are listed below. Anyone of the positive or negative tests may determine the issue.

NOT PATENTABLE	PATENTABLE
KNOWLEDGE (body of truth)	INVENTION (an idea for achievement of some practical result in the realm of technology]
DISCOVERY (Addition to general stock of human knowledge)	INNOVATION (Introduction of something new or a new idea to an existing device or invention)

Novelty Issue

The point as to whether a patent claim is patentable or not is determined by the novelty of the invention which is highly debatable as mentioned above. Some tests which are usually considered for accepting a patent by the legal authorities can be listed below but they are in no way absolute.

Positive Tests

1. Produced new, improved, or unexpected results;
2. Satisfied a long felt need;
3. Solved an outstanding problem;
4. Was contra-indicated in earlier art;
5. Succeeded over unsuccessful efforts of others;
6. Went into extensive use and enjoyed prompt and general adoption;
7. Enjoyed public acquiescence;
8. Had commercial success;
9. Possessed economy, efficiency, or other advantage, including new, improved, unexpected, or contra-indicated results;
10. Turned a halt in the art into progress; and
11. Turned a failure into a success.

Negative Tests

1. A change of form, degree, size or location;
2. A substitution of materials or equivalents;
3. A change of proportions or ingredients of a composition;
4. A duplication of parts or elements;
5. An omission of parts of elements with a corresponding omission of functions;

6. An application of an old principle to a new analogous use;
7. The reversal of parts;
8. Simply making old devices adjustable, durable, portable or movable;
9. Conversion of a manual into a mechanical operation;
10. Superior or excellent workmanship; and
11. An aggregation.

Among many things, the invention must not have been disclosed in prior publications or prior patents or must not have been involved in public use or public sale or must not have been a part of prior language or must not have been abandoned.

PATENTESE

Thus the patent laws offer enough scope for legal arguments. We shall not go into any further discussion on these points here, except mentioning that the drafting of patent claim goes into so much repugnant legal language mainly to prove that an invention is patentable. Such a language has been branded as 'patentese'. A patent issued to Galileo Galilei in Venice in 1594 is an example which reads as follows:

"That by authority of this Council be it granted to Galileo Galilei, that for the space of next twenty years no one but himself or those receiving the right from him may, in this city or in our country, make cause to be made, or, made elsewhere, use of construction for raising water and for irrigating land which, with the motion of a single horse will continuously discharge water through twenty spouts, which are found thereon, invented by him, under penalty of losing the constructions, which are to go to the petitioner, and a fine of 300 Ducats, one third to the magistrate that renders judgement and one third to the assets of our arsenal being however the petitioner obliged to have given to the light within the term of one year, said new form of construction, and that it has not been invented or disclosed by others, and provided that never before the privilege has been granted to others; otherwise let the present want be though never made." We all agree that patent language does not make it an attractive literary piece for reading. It does have an unnecessary unnatural legalistic language. (Note the length of single sentence).

CONTENTS OF PATENTS

A standard lay-out and contents for patents has resulted from the cooperation among patent offices within the patent union committee. International Cooperation in Information Retrieval among Patent Offices (ICIREPAT).

These relate to:

1. Bibliographic data on patent documents (St.9)

These appear at the head of first page of printed patent documents together with identifying codes. The codes are related to priority date, names, application number, and index information:

2. 8 - Up aperture card microforms (ST. 7/A)

Some countries like Federal Republic of Germany, publish their patents in microfilm form. These microfilms contain 8 frames of 16 mm films and are mounted on an aperture card with suitable columns for punching the bibliographic data mentioned earlier (Fig 4).

3. Country codes (ST.3)

Under ICIREPAT system, a two digited country code has been developed, e.g. Afghanistan (AF); Canada (CA); Federal Republic of Germany (DT); India (IN); Indonesia (ID); United Kingdom (GB).

SEARCHING PATENTS

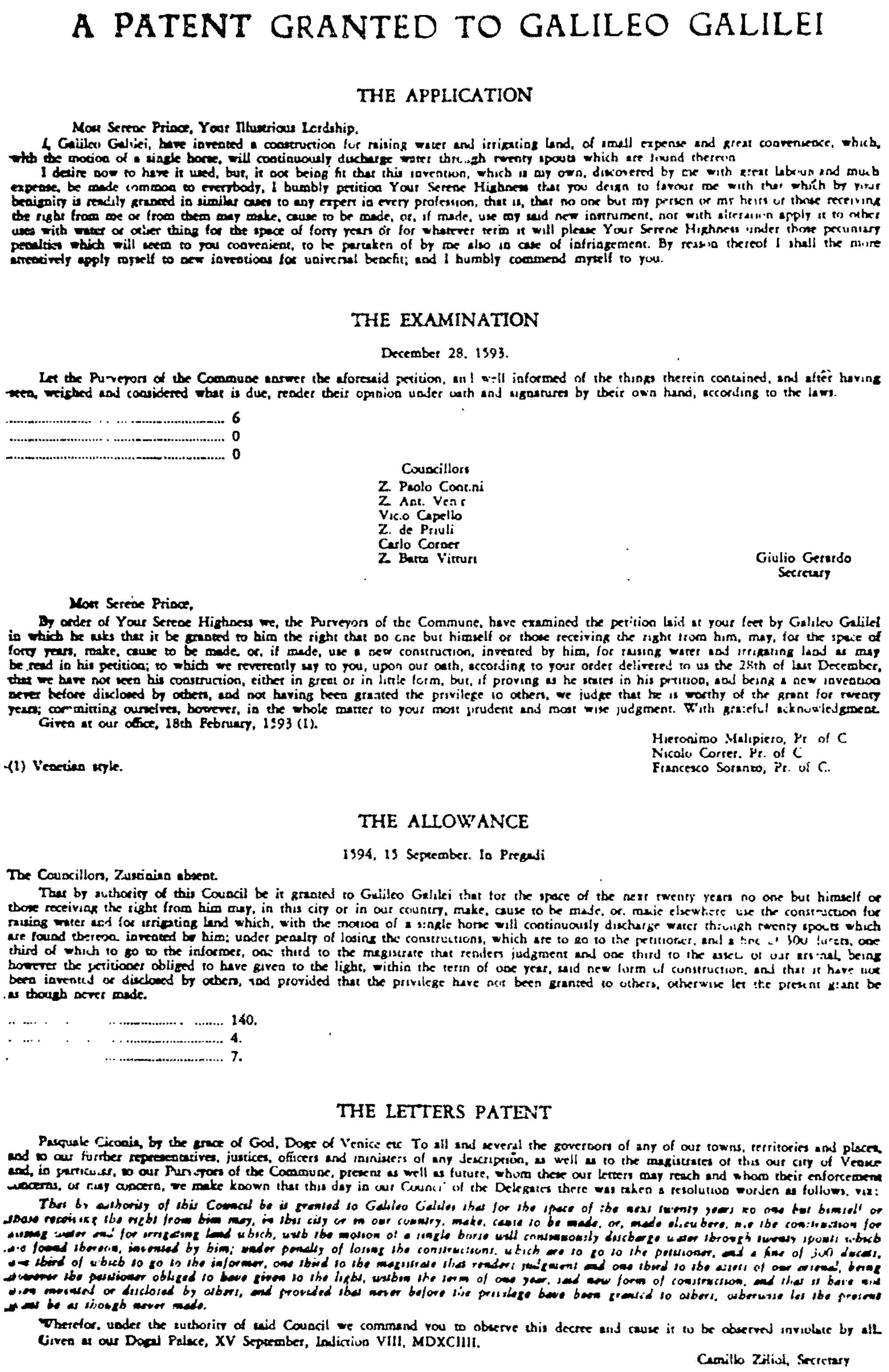
Having accepted the usefulness of the patents how do we search them for information to satisfy our own purposes?

(1) Self help; (2) Patent Agent;
(3) Computerised Searching.

In India, the Patent Office has opened a number of Patent Centres where copies of patents are available for searching.

Similarly, INPADOC gives various similar and more sophisticated services about which we shall deal later.

The Patent Office, Calcutta and its branch offices at Bombay, Madras and New Delhi have the following for the public: (1) All Indian patents kept in classified order; (2) All abridgements of published Indian patents kept in classified order; (3) Name index for the years 1959-74 and the name index published in Gazette of India, Pt. III, Section 2; (4) Serial volumes of published Indian patents; (5) Gazette of India Pt. III, Section 2 containing weekly notifications; and (6) A complete register of patents granted.



A PATENT GRANTED TO GALILEO GALILEI

THE APPLICATION

Most Serene Prince, Your Illustrious Lordship,

I, Galileo Galilei, have invented a construction for raising water and irrigating land, of small expense and great convenience, which, with the motion of a single horse, will continuously discharge water through twenty spouts which are found thereon

I desire now to have it used, but, it not being fit that this invention, which is my own, discovered by me with great labour and much expense, be made common to everybody, I humbly petition Your Serene Highness that you deign to favour me with that which by your benignity is readily granted in similar cases to any expert in every profession, that is, that no one but my person or my heirs or those receiving the right from me or from them may make, cause to be made, or, if made, use my said new instrument, nor with alteration apply it to other uses with water or other thing for the space of forty years or for whatever term it will please Your Serene Highness under those pecuniary penalties which will seem to you convenient, to be partaken of by me also in case of infringement. By reason thereof I shall the more attentively apply myself to new inventions for universal benefit; and I humbly commend myself to you.

THE EXAMINATION

December 28. 1593.

Let the Purveyors of the Commune answer the aforesaid petition, and well informed of the things therein contained, and after having seen, weighed and considered what is due, render their opinion under oath and signatures by their own hand, according to the laws.

.... 6
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Councillors
Z. Paolo Cont.ni
Z. Ant. Ven.r
Vic.o Capello
Z. de Priuli
Carlo Corner
Z. Batta Vitturi

Giulio Gerardo
Secretary

Most Serene Prince,

By order of Your Serene Highness we, the Purveyors of the Commune, have examined the petition laid at your feet by Galileo Galilei in which he asks that it be granted to him the right that no one but himself or those receiving the right from him, may, for the space of forty years, make, cause to be made, or, if made, use a new construction, invented by him, for raising water and irrigating land as may be read in his petition; to which we reverently say to you, upon our oath, according to your order delivered to us the 28th of last December, that we have not seen his construction, either in great or in little form, but, if proving as he states in his petition, and being a new invention never before disclosed by others, and not having been granted the privilege to others, we judge that he is worthy of the grant for twenty years; committing ourselves, however, in the whole matter to your most prudent and most wise judgment. With grateful acknowledgment.

Given at our office, 18th February, 1593 (1).

Hieronimo Malipiero, Pr. of C
Nicolo Correr, Pr. of C
Francesco Soranzo, Pr. of C.

(1) Venetian style.

THE ALLOWANCE

1594, 15 September. In Pregadi

The Councillors, Zustinian absent.

That by authority of this Council be it granted to Galileo Galilei that for the space of the next twenty years no one but himself or those receiving the right from him may, in this city or in our country, make, cause to be made, or, made elsewhere use the construction for raising water and for irrigating land which, with the motion of a single horse will continuously discharge water through twenty spouts which are found thereon, invented by him; under penalty of losing the constructions, which are to go to the petitioner, and a fine of 300 ducats, one third of which to go to the informer, one third to the magistrate that renders judgment and one third to the assets of our arsenal, being however the petitioner obliged to have given to the light, within the term of one year, said new form of construction, and that it have not been invented or disclosed by others, and provided that the privilege have not been granted to others, otherwise let the present grant be as though never made.

.... 140.
.... 4.
.... 7.

THE LETTERS PATENT

Pasquale Ciconia, by the grace of God, Doge of Venice etc To all and several the governors of any of our towns, territories and places, and to our further representatives, justices, officers and ministers of any description, as well as to the magistrates of this our city of Venice and, in particular, to our Purveyors of the Commune, present as well as future, whom these our letters may reach and whom their enforcement concerns, or may concern, we make known that this day in our Council of the Delegates there was taken a resolution worded as follows, viz:

That by authority of this Council be it granted to Galileo Galilei that for the space of the next twenty years no one but himself or those receiving the right from him may, in this city or in our country, make, cause to be made, or, made elsewhere, use the construction for raising water and for irrigating land which, with the motion of a single horse will continuously discharge water through twenty spouts which are found thereon, invented by him; under penalty of losing the constructions, which are to go to the petitioner, and a fine of 300 ducats, one third of which to go to the informer, one third to the magistrate that renders judgment and one third to the assets of our arsenal, being however the petitioner obliged to have given to the light, within the term of one year, said new form of construction, and that it have not been invented or disclosed by others, and provided that never before the privilege have been granted to others, otherwise let the present grant be as though never made.

Wherefor, under the authority of said Council we command you to observe this decree and cause it to be observed inviolate by all.

Given at our Dogal Palace, XV September, Indiction VIII, MDXCIIII.

Camillo Ziliol, Secretary

Fig.3 Translation of Galileo's Patent

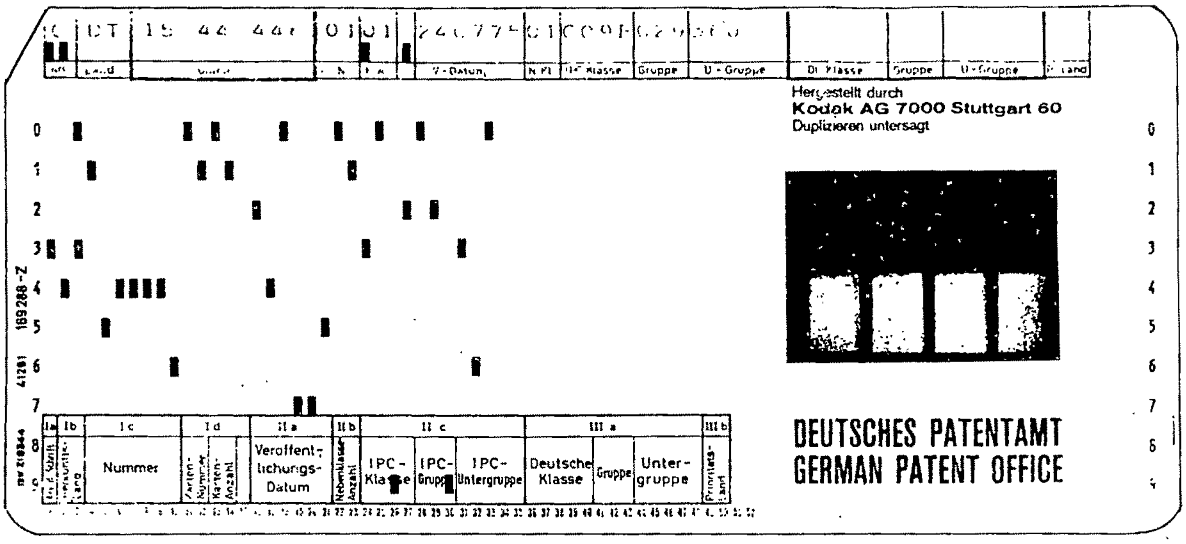


Fig.4,

Misleading Patents

Effective information about the contents of a patent, is most of the time not available from the title which is many times too brief or vague, though some titles are quite specific and give the precise claim. The former variety is sometime given by a deliberate attempt of the claimant to confuse the issue. An example is the patent on 'improvements in or relating to internal combustion engines'. The patent deals with a specific design of pistons used in such engines. The name of the applicant is very often indicative of the subject of a patent. After all, it is unlikely that a pharmaceutical firm would claim a patent in micro-electronics though it cannot be ruled out. Similarly, a boiler maker would not seek a patent on herbicide but there is a snag in that. Several large firms do not apply for patents in their own name but in someone else's name. If the name of the claimant and title of patent do not give sufficient information, the only way is to go through the legal claim, however repugnant the language may be due to patentese. Sometimes,the salient features are obvious from the attached drawings. The enormous task of going through several hundreds of such patents each week, drives most people who search patent literature by themselves, to resort to the abstracts of the same. A good abstract is difficult to find because the original claim itself is couched in such vague terms e.g. "A steel alloy characterised in that it contains zirconium 1 - 10%. Now, 1 - 10% is a wide margin. A closer look at the claim, reveals that steel alloy's Zr content is 4.56%. For enlarging legal protection,the claim has been made in the wide margin of one to ten percent.

Patent Agent

There are many patent agents who search on behalf of others for a fee. But this practice is very limited in India.

Patent Abstracts

There are two kinds of patent abstracts available:

1. Abstracting Services dealing only with patent
2. Abstracting Services including patents as one of the many forms of scientific literature.

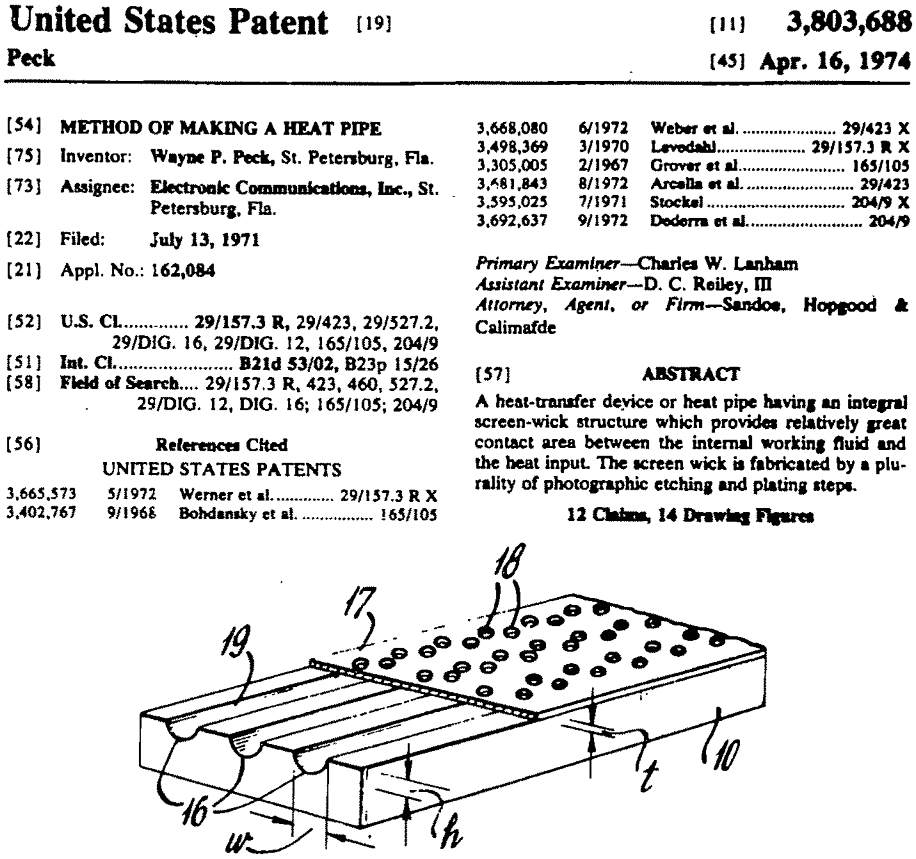
1. Abstracting Services exclusively for Patents

Here again, there are two types:
(a) Official Abstracts (b) Commercial Abstracts:

(a) Official Abstracts

Patent offices in most countries provide official abstracting journals. The British Patent Office calls it Abridgements and publishes them in 25 series. These are the versions of the examiners. In USA it is called Official Gazette of the United States Patent and Trademark Office - Patents /Fig.5/. In India, it is called 'Abridgements of Indian Patents'. These abridgements are provided with a name index and subject index from time to time.

In France 'Resumes' appear in the "Bulletin Officiel de la Propriete Industrielle" issued by the French Patent Office.



United States Patent [19]
Peck

[11] **3,803,688**
[45] **Apr. 16, 1974**

[54] **METHOD OF MAKING A HEAT PIPE**
[75] Inventor: **Wayne P. Peck,** St. Petersburg, Fla.
[73] Assignee: **Electronic Communications, Inc.,** St. Petersburg, Fla.
[22] Filed: **July 13, 1971**
[21] Appl. No.: **162,084**

[52] **U.S. Cl.**............ **29/157.3 R,** 29/423, 29/527.2, 29/DIG. 16, 29/DIG. 12, 165/105, 204/9
[51] **Int. Cl.**...................... **B21d 53/02,** B23p 15/26
[58] **Field of Search**.... 29/157.3 R, 423, 460, 527.2, 29/DIG. 12, DIG. 16; 165/105; 204/9

[56] **References Cited**
UNITED STATES PATENTS

3,665,573	5/1972	Werner et al.	29/157.3 R X
3,402,767	9/1968	Bohdansky et al.	165/105
3,668,080	6/1972	Weber et al.	29/423 X
3,498,369	3/1970	Levedahl	29/157.3 R X
3,305,005	2/1967	Grover et al	165/105
3,681,843	8/1972	Arcella et al.	29/423
3,595,025	7/1971	Stockel	204/9 X
3,692,637	9/1972	Dederra et al.	204/9

Primary Examiner—Charles W. Lanham
Assistant Examiner—D. C. Reiley, III
Attorney, Agent, or Firm—Sandoe, Hopgood & Calimafde

[57] **ABSTRACT**

A heat-transfer device or heat pipe having an integral screen-wick structure which provides relatively great contact area between the internal working fluid and the heat input. The screen wick is fabricated by a plurality of photographic etching and plating steps.

12 Claims, 14 Drawing Figures

Fig.5,

(b) Commercial Abstracts

In the Federal Republic of Germany the publisher Wila Verlag fuer Wirtschaftswerbung Wilhelm Lampl in Munich publishes Auszuege aus den Auslegeschriften with the official support of the Patent Office. The most important commercial abstracting service is from the Derwent Publications Ltd., London. It has been developing well since 1955. It has several series with a Central Patents Index comprising twelve weeklies, with subjects like polymers & plastics; pharmaceuticals; agricultural chemicals; food, disinfectants, detergents; general chemicals; textiles and paper; printing, coating, photographics; petroleum; chemical engineering, nucleonics; explosives; protection; refractories, glass, ceramics; metallurgy. These are complemented in a weekly, 'Basic Abstracts Journal'. The delay between the publication of a patent and its alerting abstract is about three to four weeks. In-house computerised search service is offered at a reasonable cost. The range of Derwent services extends over ten thousand patents per week from twenty four countries.

There are several other commercial/institutional abstracting services which are fully or partially devoted to patent abstracting on specific subjects (Fig.6).

2. Abstracting Services including patents

Among the abstracting services which include patents as one of the many forms of scientific literature, the most important and reliable service is Chemical Abstracts. It covers patents from more than twenty five countries. The Chemical Abstracts is famous for its provision of depth indexing and independent patent index.

The Science Abstracts rearranged in the form of INSPEC is another similar service. Referativnyi Zhurnal, the Russian counterpart, gives extensive coverage to Eastern Bloc Countries though Russian language is a major impediment for its use in English using countries.

Patent Classification

While making a search for patents in any country, one has to become familiar with the classification of patents used in that country. Each country has developed its own system of classification and an International Patent Classification (IPC) has also been developed by ICIREPAT. The working party organised by the Council of Europe produced a framework in 1954 for IPC which consisted of eight major sections and about six hundred subclasses. In 1968, about 6000 sub-groups were published. Revision of the system is a continuing affair. Some 40 countries are now applying IPC numbers to their published patents.

IPC has been produced with the intention of classifying all inventions to be classified as a whole and not by separate classification of constituent parts, which is practicable in indexing systems by references only. The system is published in two parts. First part is in loose leaf form, being the classification key and the second part contains the catchword index.

Patent Concordance

Searching patents involves finding out the related patents in other countries. In recent years, Chemical Abstracts, Derwent Publications Ltd., and other patent abstracts are bringing out patent concordances in different countries. If one wants to search specific patents of particular countries, individual search through that country's patent indexes/abridgements has to be resorted to. A personal index establishing equivalents in different countries can be arranged in a chronological arrangement as below for personal use e.g.

Germany M 23456 9 July 1965

M/S Griesheim GMBH

Continuous Casting.

Brit Pat. 1,130,294

French Pat. 1,418,678

In a way,patent concordance helps one in understanding a claim more clearly since the patent claim is consulted in the favoured language.

Licensing Patents

Many patents are licensed by the inventor to a party or parties and this information may or may not be disclosed in the patent. Advertisements for such licenses appear in official journals of patents as well as other places. At the same time, appearance of an advertisement is merely a pretext for one to indicate that the inventor is still working on the subject. In India as well as UK, the National Research Development Corporation (NRDC), takes charge of the licensing and commercial exploitation of patents arising from national laboratories and public sector R & D centres. NRDC finances such projects in building of prototypes, pilot plants and developmental stages. Some recent projects of this kind are: V H F promotion link, electrolytic manganese dioxide, vinyl pyridine monomer, etc. Where licenses are granted, NRDC offers the right to use the know-how of the patent as developed by the laboratory, including training facilities,and help in importing equipment or raw materials.

Patent Associated Literature (PAL) Service

The service has been developed by INSPEC to help patent searching authority with provision of non-patent literature which is required to be consulted. In its introductory phase the service covers the fields of physics,electrical engineering, electronics, computers and control and is likely to be extended to mechanical engineering and chemical field. The service for the patent offices will be a full text copy service. Photocopy of the article will be supplied with an information sheet containing bibliographical data and Int. Cl. code. Copies of non-English articles are accompanied by an English abstract prepared by INSPEC

Japan Patent Information Centre (JAPATIC)

The Centre is a non-profit organization established in 1971. It provides SDI service and retrospective search service with its most modern computerised information retrieval system.

International Sources

It has been widely realised that international cooperation in exchange of patent literature is essential. As a result of this, three inter-connected organisations have come into existence at international level. These are:

(1) World Intellectual Property Organisation (WIPO);

(2) International Cooperation in Information Retrieval among Patent Examining Offices (ICIREPAT); and

(3) International Patent Documentation Centre (INPADOC).

TITLE	PUBLISHER	percent. of patents approx.	public. delay months
Abstract Bulletin of the Institute of Paper Chemistry (m)	Institute of Paper Chemistry, P.O.Box 1048 Appleton, Wisconsin 54911 U.S.A.	45	4
Airplane Patent Digest (m)	Manufacturers Aircraft Ass. Inc. 45 Rockefeller Plaza, New York U.S.A.	100	1
API Abstracts (in microform)	American Petroleum Institute		
Air and Water Conservation (w)			
Refining Patents (w)		100	
Petroleum Substitutes (m)			
Transportation and Storage (m)			
Automotive Emission Control	R.H. Chandler Ltd. P.O. Box 55, Braintree Essex CP7 6HD U.K.		
British Food Manufacturing Industries Research Ass. Abstracts (m)	Randalls Road, Leatherhead, Surrey U.K.	8	2–6
Computer Abstracts (m)	Technical Information Co Ltd, Martins Bank Chambers P.O. Box 59, St Helier, Jersey		3–12
Continental Paint and Resin News (m)	R.H. Chandler Ltd. P.O. Box 55, Braintree Essex CP7 6HD U.K.		1
Corrosion Control Abstracts (m)	Scientific Information Consultants Ltd. 661 Finchley Road, London NW2 2HN U.K.		18
Cybernetics Abstracts (m)	same		18
Desalination Abstracts (qw)	Center of Scientific and Technical Information 84 Hachashmonaim Street, Tel Aviv, Israel	25	2–8

Fig.6 Abstracting Journals in English

WIPO

This organisation, established in 1967 in Geneva (earlier known as the International Bureau for the Protection of Intellectual Property) has the following objectives:

(1) To promote the protection of intellectual property throughout the world; and

(2) To ensure administrative cooperation among various unions established by international agreements to protect rights relating to intellectual activities in the industrial, scientific, literary and artistic fields.

Its programme of activities can be broadly grouped as follows:

(a) Development of an international patent classification (IPC);

(b) Creation of an up-to-date world data bank of bibliographic details of patent documents; and

(c) Provision of searches of patents particularly of developing countries. This cooperative activity which was linked to India by Insdoc, is now carried out by the Patents Wing of CSIR which is a sister organisation. WIPO had 84 countries including India as its member, in 1979.

ICIREPAT

This organisation conceived originally as an informal group in 1961 was christened as such at Munich in 1962. It started functioning from WIPO,Geneva in 1968 as a formal wing of WIPO including the International Patent Institute of Hague. Its main purpose and programme are to standardise patents and to develop computerised searching systems for patent information. Nine such systems for subjects like lubricants, lasers, etc. have already been developed and more are in progress.

INPADOC

This organisation located in Vienna, and established in 1972, has become the hub of WIPO service for patent information. It is a combined organisation of WIPO and Austrian Government, creating an information file called INPADOC Data Base (IDB) covering 90% of world patents from 46 countries including India (Fig.7). The IDB is growing at the rate of 800,000 patent records per year.

INPADOC has world's largest collection of copies of patent documents in 16 mm microfilm.

INPADOC data base 1973-1977. Backfile 2

Country code	Country	Starting date (if later than 1973)	Number
AR	Argentina	—	11,819
AT	Austria	—	58,271
AU	Australia	—	56,967
BE	Belgium	—	68,555
BG	Bulgaria	—	6,375
BR	Brazil	740718	63,483
CA	Canada	740101	83,424*
CH	Switzerland	—	64,884
CS	Czechoslovakia	—	29,902
CU	Cuba	740213	261
CY	Cyprus	750301	119
DD	German Democratic Republic	—	33,898
DE	Feberal Republic of Germany	—	596,543
DK	Denmark	—	34,730
EG	Egypt	760331	911
ES	Spain	—	129,934
FI	Finland	—	19,726
FR	France	—	313,681
GB	United Kingdom	—	192,307
GR	Greece	770704	576
HK	Hong Kong	760305	1,308
HU	Hungary	—	8,685
IE	Ireland	—	5,925
IL	Israel	—	21,126
IN	India	750802	3,260
IT	Italy	—	80,969
JP	Japan	—	901,026
KE	Kenya	750711	120
LU	Luxembourg	—	11,529
MC	Monaco	751010	91
MN	Mongolia	—	30
MW	Malawi	—	145
NL	Netherlands	—	79,148
NO	Norway	—	29,275
PH	Philippines	750703	1,670
PL	Poland	—	26,974
PT	Portugal	760101	2,750
RO	Romana	—	7,609
SE	Sweden	—	109,523
SU	Soviet Union	—	193,575
TR	Turkey	—	1,418
US	United States of America	—	352,065
YU	Yugoslavia	—	4,766
ZA	South Africa	—	27,349
ZM	Zambia	—	827
45	TOTAL		3,637,529

* Reproduced with the permission of Information Canada.

Fig.7,

rolls which is always being kept up-to-date. It has a cooperative arrangement whereby the cooperating countries get in exchange of their inputs of national patent records, the cumulated standard data tape. It offers several services:

1) International Patent Gazette;
2) Patent Family Service;
3) Patent Classification Service;
4) Patent Application Service; and
5) Numerical Data Base Service.

Supply of copies of patents in microfiche is an important service.

1) The International Patent Gazette on microfiche is a comprehensive service while the others cover specific areas.

2) The Patent Family Service (PFS) relates to patents for which applications are filed in various countries and based on the same priority application as recognised in the Paris convention. In this service documents are sorted according to priority and publication data. The sorted data provides a cumulation for five years. (Fig 8)

3) The Patent Classification Service identifies patents according to IPC. The sorted data gives a cumulation for 5 years in microfiche form at the rate of $ 6250 per quarter year. (Fig 9)

4) The Patent Application Service identifies patent documents of a selected number of countries as being connected by a common applicant. (Fig 10)

5) The Numerical Data Base Service identifies patents by their number. (Fig 11)

All these are available on COM (Computer on Microfiche) or hard copies for a small number of pages.

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3. Quarda, G: Computerised patent documentation system of INPADOC. International Forum on Information & Documentation 1979, 4(4), 26-35.

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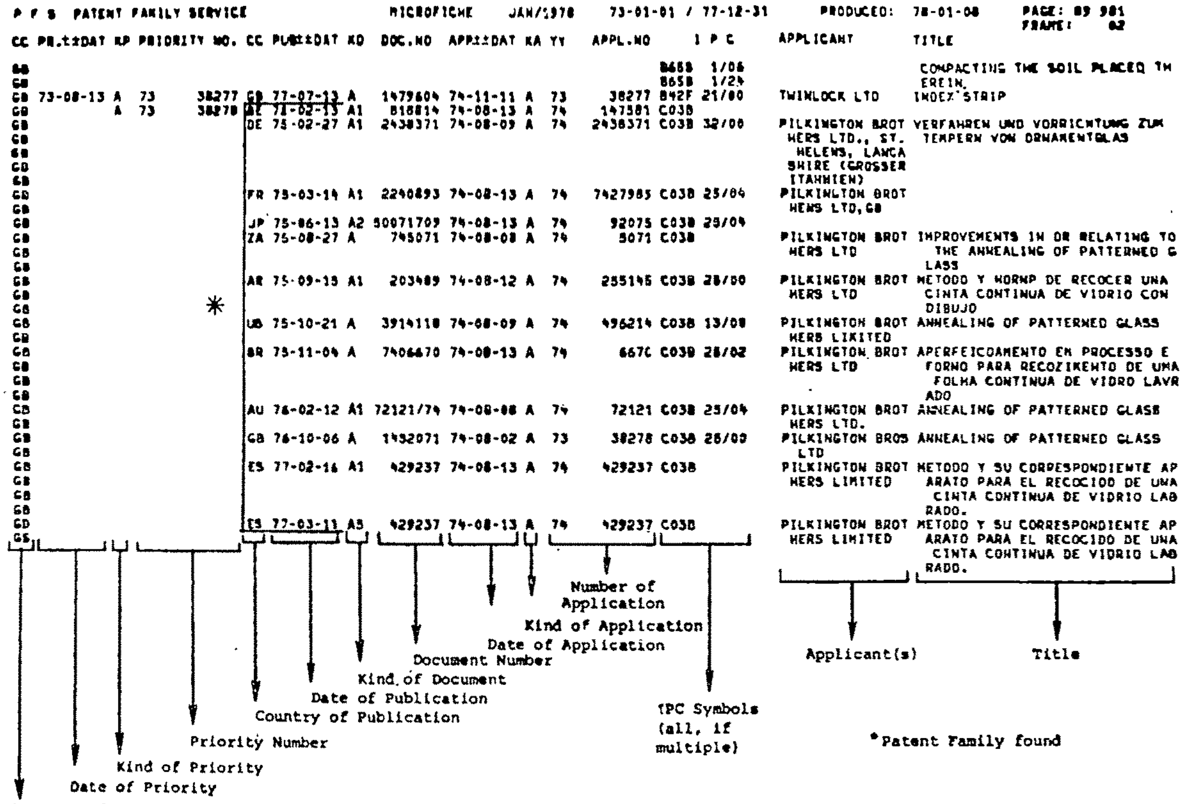

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GB                                                                           B65B  1/06                       COMPACTING THE SOIL PLACEQ TH
GB                                                                           B65B  1/24                       EREIN.
GB 73-08-13 A  73      38277 GB 77-07-13 A   1479604 74-11-11 A  73    38277 B42F 21/00  TWINLOCK LTD     INDEX STRIP
GB          A  73      38278 DE 74-02-13 A1   818814 74-08-13 A  74   147581 C03B
GB                           DE 75-02-27 A1  2438371 74-08-09 A  74  2438371 C03B 32/00  PILKINGTON BROT VERFAHREN UND VORRICHTUNG ZUM
GB                                                                                        HERS LTD., ST.  TEMPERN VON ORNAMENTGLAS
GB                                                                                         HELENS, LANCA
GB                                                                                        SHIRE (GROSSER
GB                                                                                        ITAHHIEN)
GB                           FR 75-03-14 A1  2240893 74-08-13 A  74  7427985 C03B 25/04  PILKINLTON BROT
GB                                                                                        HENS LTD,GB
GB                           JP 75-06-13 A2 50071709 74-08-13 A  74    92075 C03B 25/04
GB                           ZA 75-08-27 A    745071 74-08-08 A  74     5071 C03B        PILKINGTON BROT IMPROVEMENTS IN OR RELATING TO
GB                                                                                        HERS LTD          THE ANNEALING OF PATTERNED G
GB                                                                                                         LASS
GB                           AR 75-09-15 A1   203489 74-08-12 A  74   255145 C03B 25/00  PILKINGTON BROT METODO Y HORNP DE RECOCER UNA
GB                                                                                        HERS LTD         CINTA CONTINUA DE VIDRIO CON
GB                     *                                                                                   DIBUJO
GB                           US 75-10-21 A   3914110 74-08-09 A  74   496214 C03B 13/08  PILKINGTON BROT ANNEALING OF PATTERNED GLASS
GB                                                                                        HERB LIKITED
GB                           BR 75-11-04 A   7406470 74-08-13 A  74     667C C03B 25/02  PILKINGTON BROT APERFEICOAMENTO EN PROCESSO E
GB                                                                                        HERS LTD         FORNO PARA RECOZIKENTO DE UMA
GB                                                                                                          FOLHA CONTINUA DE VIDRO LAVR
GB                                                                                                         ADO
GB                           AU 76-02-12 A1 72121/74 74-08-08 A  74    72121 C03B 25/04  PILKINGTON BROT ANNEALING OF PATTERNED GLASS
GB                                                                                        HERS LTD.
GB                           GB 76-10-06 A   1452071 74-08-02 A  73    38278 C03B 25/00  PILKINGTON BROS ANNEALING OF PATTERNED GLASS
GB                                                                                         LTD
GB                           ES 77-02-16 A1   429237 74-08-13 A  74   429237 C03B        PILKINGTON BROT METODO Y SU CORRESPONDIENTE AP
GB                                                                                        HERS LIMITED     ARATO PARA EL RECOCIOD DE UNA
GB                                                                                                          CINTA CONTINUA DE VIDRIO LAB
GB                                                                                                         RADO.
GB                           ES 77-03-11 A5   429237 74-08-13 A  74   429237 C03B        PILKINGTON BROT METODO Y SU CORRESPONDIENTE AP
GB                                                                                        HERS LIMITED     ARATO PARA EL RECOCIDO DE UNA
                                                                                                            CINTA CONTINUA DE VIDRIO LAB
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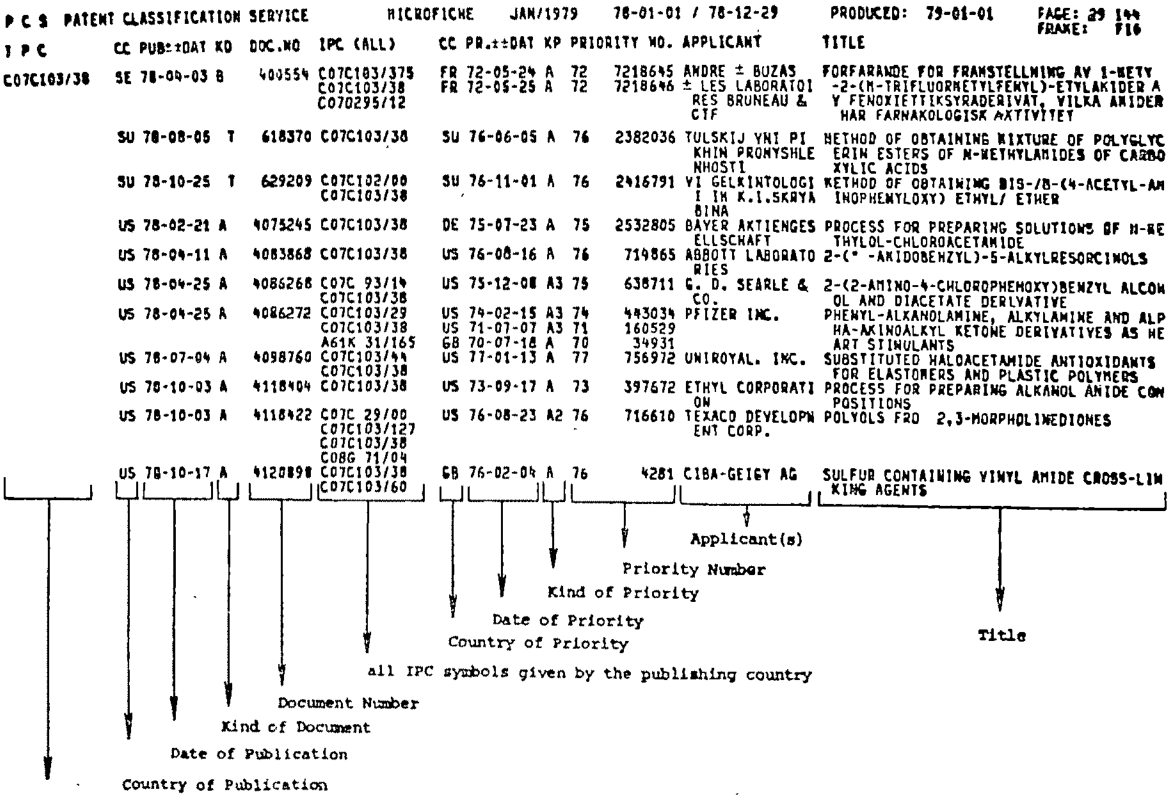
Fig.8 Patent Family Service



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I P C        CC PUB±±DAT KD  DOC.NO  IPC (ALL)     CC PR.±±DAT KP PRIORITY NO. APPLICANT       TITLE

C07C103/38   SE 78-04-03 B    400554 C07C103/375   FR 72-05-24 A  72   7218645 ANDRE ± BUZAS   FORFARANDE FOR FRAMSTELLNING AV 1-METY
                                     C07C103/38    FR 72-05-25 A  72   7218646 ± LES LABORATOI  -2-(M-TRIFLUORMETYLFENYL)-ETYLAMIDER A
                                     C070295/12                                   RES BRUNEAU &  Y FENOXIETTIKSYRADERIVAT, VILKA AMIDER
                                                                                  CIF             HAR FARMAKOLOGISK AKTIVITET
             SU 78-08-05 T    618370 C07C103/38    SU 76-06-05 A  76   2382036 TULSKIJ VNI PI  METHOD OF OBTAINING MIXTURE OF POLYGLYC
                                                                                  KHIN PROMYSHLE  ERIN ESTERS OF N-METHYLAMIDES OF CARBO
                                                                                  NHOSTI          XYLIC ACIDS
             SU 78-10-25 T    629209 C07C102/00    SU 76-11-01 A  76   2416791 VI GELKINTOLOGI METHOD OF OBTAINING BIS-/B-(4-ACETYL-AM
                                     C07C103/38                                   I IM K.I.SKRYA  INOPHENYLOXY) ETHYL/ ETHER
                                                                                  BINA
             US 78-02-21 A   4075245 C07C103/38    DE 75-07-23 A  75   2532805 BAYER AKTIENGES PROCESS FOR PREPARING SOLUTIONS OF N-ME
                                                                                  ELLSCHAFT       THYLOL-CHLOROACETAMIDE
             US 78-04-11 A   4083868 C07C103/38    US 76-08-16 A  76    719865 ABBOTT LABORATO 2-(* -AMIDOBENZYL)-5-ALKYLRESORCINOLS
                                                                                  RIES
             US 78-04-25 A   4086268 C07C 93/14    US 75-12-08 A3 75    638711 G. D. SEARLE &  2-(2-AMINO-4-CHLOROPHENOXY)BENZYL ALCOH
                                     C07C103/38                                   CO.             OL AND DIACETATE DERIVATIVE
             US 78-04-25 A   4086272 C07C103/29    US 74-02-15 A3 74    443034 PFIZER INC.     PHENYL-ALKANOLAMINE, ALKYLAMINE AND ALP
                                     C07C103/38    US 71-07-07 A3 71    160529                  HA-AMINOALKYL KETONE DERIVATIVES AS HE
                                     A61K 31/165   GB 70-07-18 A  70     34931                  ART STIMULANTS
             US 78-07-04 A   4098760 C07C103/44    US 77-01-13 A  77    756972 UNIROYAL. INC.  SUBSTITUTED HALOACETAMIDE ANTIOXIDANTS
                                     C07C103/38                                                 FOR ELASTOMERS AND PLASTIC POLYMERS
             US 78-10-03 A   4118404 C07C103/38    US 73-09-17 A  73    397672 ETHYL CORPORATI PROCESS FOR PREPARING ALKANOL AMIDE COM
                                                                                  ON              POSITIONS
             US 78-10-03 A   4118422 C07C 29/00    US 76-08-23 A2 76    716610 TEXACO DEVELOPM POLYOLS FRO  2,3-MORPHOLINEDIONES
                                     C07C103/127                                  ENT CORP.
                                     C07C103/38
                                     C08G 71/04
             US 78-10-17 A   4120898 C07C103/38    GB 76-02-04 A  76      4281 CIBA-GEIGY AG   SULFUR CONTAINING VINYL AMIDE CROSS-LIN
                                     C07C103/60                                                 KING AGENTS
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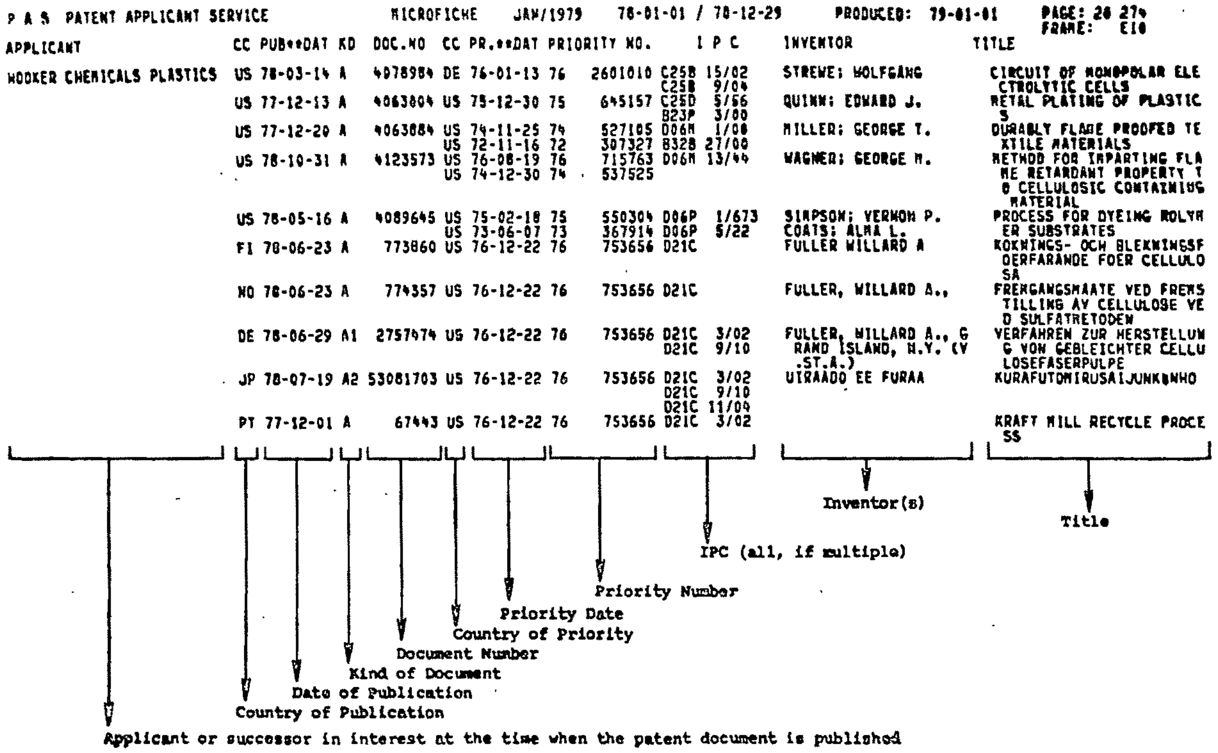
Fig.9 Patent Classification Service



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APPLICANT                   CC PUB**DAT KD  DOC.NO  CC PR.**DAT PRIORITY NO.     I P C      INVENTOR                 TITLE

HOOKER CHEMICALS PLASTICS   US 78-03-14 A   4078984 DE 76-01-13 76   2601010 C25B 15/02   STREWE; WOLFGANG          CIRCUIT OF MONOPOLAR ELE
                                                                             C25B  9/04                              CTROLYTIC CELLS
                            US 77-12-13 A   4063804 US 75-12-30 75    645157 C25D  5/56   QUINN; EDWARD J.          METAL PLATING OF PLASTIC
                                                                             B23P  3/00                             S
                            US 77-12-20 A   4063884 US 74-11-25 74    527105 D06M  1/00   MILLER; GEORGE T.         DURABLY FLAME PROOFED TE
                                                    US 72-11-16 72    307327 B32B 27/00                              XTILE MATERIALS
                            US 78-10-31 A   4123573 US 76-08-19 76    715763 D06M 13/44   WAGNER; GEORGE M.         METHOD FOR IMPARTING FLA
                                                    US 74-12-30 74    537525                                         ME RETARDANT PROPERTY T
                                                                                                                     O CELLULOSIC CONTAINING
                                                                                                                      MATERIAL
                            US 78-05-16 A   4089645 US 75-02-18 75    550304 D06P  1/673  SIMPSON; VERNON P.        PROCESS FOR DYEING POLYM
                                                    US 73-06-07 73    367914 D06P  5/22   COATS; ALMA L.             ER SUBSTRATES
                            FI 78-06-23 A    773860 US 76-12-22 76    753656 D21C         FULLER WILLARD A          KOKNINGS- OCH BLEKNINGSF
                                                                                                                     OERFARANDE FOER CELLULO
                                                                                                                     SA
                            NO 78-06-23 A    774357 US 76-12-22 76    753656 D21C         FULLER, WILLARD A.,       FREMGANGSMAATE VED FREMS
                                                                                                                     TILLING AV CELLULOSE VE
                                                                                                                     D SULFATRETODEN
                            DE 78-06-29 A1  2757474 US 76-12-22 76    753656 D21C  3/02   FULLER, WILLARD A., G     VERFAHREN ZUR HERSTELLUN
                                                                             D21C  9/10    RAND ISLAND, N.Y. (V      G VON GEBLEICHTER CELLU
                                                                                           .ST.A.)                   LOSEFASERPULPE
                            JP 78-07-19 A2 53081703 US 76-12-22 76    753656 D21C  3/02   UIRAADO EE FURAA          KURAFUTOMIRUSAIJUNKANHO
                                                                             D21C  9/10
                                                                             D21C 11/04
                            PT 77-12-01 A     67443 US 76-12-22 76    753656 D21C  3/02                             KRAFT MILL RECYCLE PROCE
                                                                                                                     SS
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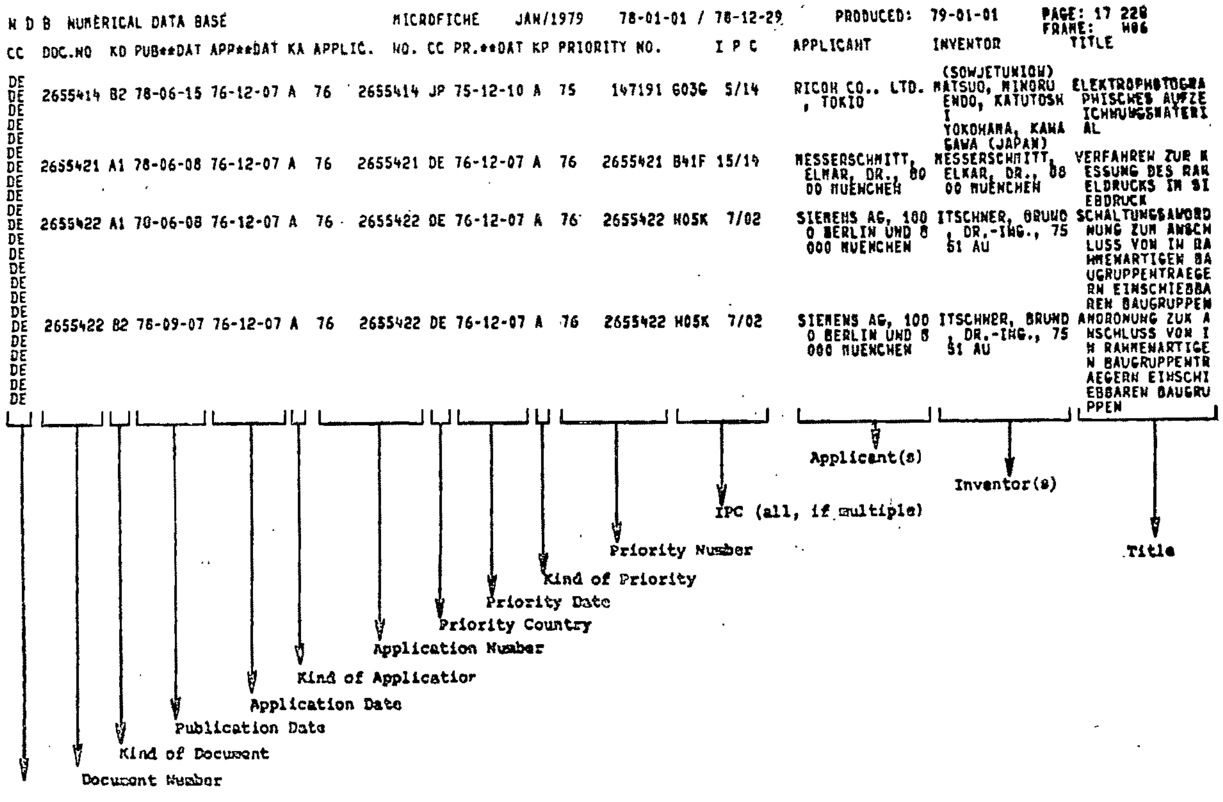
Fig.10 Patent Applicant Service



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N D B  NUMERICAL DATA BASE                MICROFICHE    JAN/1979    78-01-01 / 78-12-29     PRODUCED:  79-01-01     PAGE: 17 228
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DE                                                                                                           (SOWJETUNION)
DE  2655414 B2 78-06-15 76-12-07 A  76   2655414 JP 75-12-10 A  75    147191 G03G  5/14   RICOH CO., LTD. MATSUO, MINORU  ELEKTROPHOTOGRA
DE                                                                                         , TOKIO         ENDO, KATUTOSH  PHISCHES AUFZE
DE                                                                                                         I                ICHNUNGSMATERI
DE                                                                                                         YOKOHAMA, KAWA  AL
DE                                                                                                         GAWA (JAPAN)
DE  2655421 A1 78-06-08 76-12-07 A  76   2655421 DE 76-12-07 A  76   2655421 B41F 15/14   MESSERSCHMITT,  MESSERSCHMITT,  VERFAHREN ZUR M
DE                                                                                         ELMAR, DR., 80  ELKAR, DR., 08   ESSUNG DES RAK
DE                                                                                         00 MUENCHEN     00 MUENCHEN      ELDRUCKS IM SI
DE                                                                                                                          EBDRUCK
DE  2655422 A1 78-06-08 76-12-07 A  76   2655422 DE 76-12-07 A  76   2655422 H05K  7/02   SIEMENS AG, 100 ITSCHNER, BRUNO SCHALTUNGSANORD
DE                                                                                         0 BERLIN UND 8  , DR.-ING., 75   NUNG ZUM ANSCH
DE                                                                                         000 MUENCHEN    51 AU            LUSS VON IN RA
DE                                                                                                                          HMENARTIGEN BA
DE                                                                                                                          UGRUPPENTRAEGE
DE                                                                                                                          RN EINSCHIEBBA
DE                                                                                                                          REN BAUGRUPPEN
DE  2655422 B2 78-09-07 76-12-07 A  76   2655422 DE 76-12-07 A  76   2655422 H05K  7/02   SIEMENS AG, 100 ITSCHNER, BRUNO ANORDNUNG ZUM A
DE                                                                                         0 BERLIN UND 8  , DR.-ING., 75   NSCHLUSS VON I
DE                                                                                         000 MUENCHEN    51 AU            N RAHMENARTIGE
DE                                                                                                                          N BAUGRUPPENTR
DE                                                                                                                          AEGERN EINSCHI
DE                                                                                                                          EBBAREN BAUGRU
DE                                                                                                                          PPEN
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Fig.11 Numerical Data Base

Annals of Library Science and Documentation
1980, 27(1-4), 90-95.

UNIVERSITY OF DAR ES SALAAM LIBRARY

J.C. GERA
University of Dar es Salaam
Dar es Salaam
Tanzania.

The University of Dar-es-Salaam Library started a decade ago and at present it is serving several thousands of readers regularly. The Library acquires about 10,000 documents per year. The problems, the Library is facing, are many and varied. The author has highlighted the problems and described some measures, that have been taken to solve them. The services, cataloguing and acquisition procedures of the Library have also been described.

'Libraries are the Processes of which Adult Leaders of a Society are able to Inject Philosophical Ideas,Understanding and Being Able to Judge Themselves"- Nyerere

INTRODUCTION

University of Dar es Salaam, the national university of Tanzania is imparting specialized literary education for a decade. Recently, the University celebrated its 10th anniversary. On this occasion, newspapers carried a series of articles on the development of various organs during the last decade. During its short tenure of a decade it had the privilege of having three different centers - Muhimbili Medical Centre; Faculty of Agriculture, Forestry and Veterinary Sciences at Morogoro; and Institute of Marine Sciences at Zanzibar. These Centres specialise in their respective branches of science. At the main Campus various faculties specialising in the field of Management; Development Studies; Linguistics; Arts & Theatre; Computer Science; Applied Sciences; Engineering (Chemical, Mechanical, Civil, Electrical and Hydraulic) have been functioning to impart specialized job-oriented education to the nationals in order to achieve the cherished aims and goals of the nation. President Mwalimu Julius K. Nyerere, pledged at the time of getting independence that the country was to be led towards 'Socialism' and 'Self-reliance'. The University on its part has also been committed to aim at relevance and service to a developing socialist Tanzania.

Considerable emphasis is being given to education which is in accordance with the national manpower needs. Development has been made at the educational level, which can be seen in the figure given below:

1.	Government Secondary Schools	- 84
2.	National Teacher's Colleges	- 37
3.	Folk Development Colleges	- 51
4.	Technical Colleges	- 2

In addition, there are other institutes like Institute of Education, Institute of Financial Management, Institute of Adult Education, etc.

It may be mentioned here that 31% of the Education budget is spent on this University and its campuses.

PROBLEMS: INCREASE IN CLIENTELE

There has been tremendous increase in the number of recepients and seekers of knowledge, the students. In 1970, the number of students was 2065, and in 1979/80 the number rose to 3403 registering an increase of 65%.

It is estimated that in the next ten years the number of students will be double of the present strength. The Central library of the University is a fine example of the academic library in the country. It has been meeting the needs of its clients— students, teachers, researchers of the University and scientists and industrialists in the country.

Inspite of efficient services being rendered at the Library to fulfil the needs of the readers, still we are literally on tenterhooks because of overwhelming demands from students. The most conservative estimates indicate that undergraduate students have doubled in the last 10 years and in the next ten years they will overcrowd their own University library during term time and other libraries during vacations. The number of graduate and post-graduate students will also increase, and the development of new graduate programme will put a terrific strain on the library resources.

There is an increasing number of Ph.D. programs developing, with multi-set of problems and demands. We as teachers and librarians want all these to happen, yet we do not know how we are to handle the situation.

It is also evident that emphasis on foreign languages will have tremendous implications for the Library. It will not be long when our faculties will expect the library to have a good collection of foreign language publications. For processing and maintenance, deployment of suitable staff with sound knowledge of these languages will be an additional problem for the library.

Science and technology is developing at a great speed. Very soon the libraries may reach a saturation point. Such a situation may be tremendously exiting. But there will be many problems.

LITERATURE EXPLOSION

One of the most baffling problems now facing librarians and documentalists alike is the control of the tremendous flood of publications now being poured out from the world's presses. Even the largest libraries long ago conceded defeat while struggling alone against this tide and have offered cooperation with other libraries coping with the same problem. Research is also progressing at a tremendous rate, the findings of which in turn resulting in the publication of more books, articles, pamphlets, leaflets, and technical reports. Because of inadequate indexing, abstracting, acquisition, processing, and servicing, scientists are becoming increasingly frustrated in their efforts to keep themselves abreast of the progress in their own specialities. Automation comes slowly to libraries, but the librarian of a large research institution now admits that his outdated manual procedures are no longer appropriate to the tasks at hand.

GROWTH IN LITERATURE

The pressure of rising publications, together with the dazzling potentialities of the electronic computer, are forcing librarians to think more quantitatively about their libraries than most of them ever had done before.

The problem arises as to how books and periodicals should be placed in regard to accessibility. Which items should be put on open shelves, which in stacks, which on special reserve to be used only in the library and so on. If the extent of use of books can be predicted, one can estimate the percentage of users who will be frustrated or delayed by reducing the books accessibility.

ACQUISITION PROGRAMME

University of Dar es Salaam Library acquisition programme is based on deposit, purchase, donations and exchange.

Deposits

By passing the Libraries (Deposit of Books) Act 1962 the Government has made it compulsory for every publisher in Tanzania to deposit the book at his own expense to the librarian, University College of Dar es Salaam within one month after its publication. The University library is a legal deposit library for the nation. It has the obligation to maintain the collection, preserve it and retrieve for the use of nation when needed. It is difficult to get the exact statistics of how many documents are thus deposited, but it is estimated that about 3,000 to 4,000 documents are received every year.

Purchase

The library purchases books and subscribes to about 3,000 journal titles for the use of the academic community. In its acquisition programme the academic community participates fully keeping in view the current needs, as is evident from the table in the next page.

Donations

The University receives books as donations from organizations, individuals and embassies. It is estimated that more than 1,000 documents are received every year on gratis. Thus the Library adds about 10,000 documents in a year to its collection. The future shape of the Library can be imagined when after 10 years about 1,00,000 items will be added to its collection apart from the

Purchase of Books.

Year	Suggestions Received,	Books ordered	Books Received.
1974/75	5,134	7,598	4,092
1975/76	5,582	4,074	4,785
1976/77	3,192	1,684	1,975
1977/78	3,501	3,230	1,651
1978/79	3,535	2,628	2,485
1979/80	1,222	2,190	1,735
	22,136	21,404	16,723

research reports and dissertations which will form an integral part of the collection. All this will need processing and putting them m to use.

Of late, the teachers and students who are the main clients of the Library are often faced with the problem of non-availability of reading materials, which were acquired, processed and had gone to the collection. While locating material for circulation, it is often observed that the material supposed to have been in the collection is "not available", "missing" or "lost".

NATURE OF THE PROBLEMS

Non-availability of the reading materials can be attributed to the following reasons: (a) The document is missing due to outright theft (b) deliberate misshelving by a reader for shelfish interests (c) the document is overdue (d) Part of a document or whole of the material between the hard covers has been torn out and taken away.

Deformations of Documents and their Untimely Spoilage

In addition to the hazards of an open access library, the fate of the books are very sad due to the undemocratic attitude of some readers. Books suffer at every stage. The tops of the spines are torn because of their being pulled from the shelf by fingers. The stitches that hold the pages together are often torn by violent openings. Spines are cracked and pages soiled through the habit of keeping open the book facing downwards. The corners of leaves are folded and eventually folded off for use as book marks. Margins are taken as free space to write on. Whole pages are some time heavily underlined. People are too lazy to take notes and criminally indifferent to the needs of others. They even go to the extent of tearing out scores of pages. Illustrations are at times, deformed beyond recognition by improvised beards, caste-marks, spectacles, and some plates have been lost for ever. Biro pens are used on maps for drawing additional lines, shading and even for colouring, rendering them useless for futher use. Certain books showed the sign of having been used as protection against rain. There is no dearth of dirt in the books. Books thus meet the premature and untimely end. All these are due to academic criminals.

EXTENT OF THE PROBLEMS

Loss of Books

The stock verification at the Library held in 1975 revealed the loss of material as follows:

Year	Estimated no of books lost	Estimated loss percentage
1975	10,000	18%

This loss of 18% in the last 10 years means a loss of 2% per year which is negligible in an open access national university library, but in actuality the loss is even more significant because the 10,000 books represented crucial material which were on heavy demand. Moreover, they were expensive and impossible to replace.

MUTILATION OF ARTICLES

Year	Approx. no. of journals.
1975	3,000

In one case the lecturer found that out of the 10 journal references recommended to the class 7 were cut off from the journals.

One general and constant complaint of the students is that not enough copies are available in the library of the materials on heavy demand.

Overdue Material

The most difficult problem in the Library relates to overdue books loaned to teachers and students, who ignore the call notices and decide to retain the books for their selfish use only. "Save the library compaign week" was organised by the University of Dar es Salaam and its various campuses early this year. An amnesty period of two weeks was declared when the readers were allowed to return books without fine. The following figures show the overdue and return pattern.

UNIVERSITY OF DAR ES SALAAM LIBRARY

RETURN OF OVERDUE BOOKS

LIBRARY	OVERDUE		RETURNED		PER CENTAGE	
	Books	Periodicals	Books	Periodicals	Books	Periodicals
Main Campus	2,504	-	950	-	37.94%	-
Morogoro	480	135	189	15	28.13%	11.11%

OVERDUE BOOKS STILL OUTSTANDING

MAIN CAMPUS

Borrowers	Pre. 1979	1979	Total	Percentage
Academic staff	290	548	838	Approx. 53.9%
Library staff	88	19	107	6.9%
External borrower	12	24	36	2.3%
Students	274	299	573	36.9%
	664	890	1,554	100.00%

It may be observed that out of the total of 2,504 books overdue only 950(37.9%) were returned and 1554 (62.1%) were still outstanding in spite of vigorous campaign of wall posters, lectures, radio talks, exhibition of mutilated books etc. It may be pointed out here that out of the 1554 overdue books for the period of more than a year, majority /̅ 838 (53.9%) ̲7 were held by teachers and 573 (36.9%) by students and the rest 109 (6.9%) by staff and 36 (2.3%) by external borrower.

Space Problem

It is not in the schools and colleges alone that curriculum contents are expanding. University education with a multi-track curricula, honours courses, and new disciplines particularly in sciences and foreign languages are adding breadth and depth, and placing responsibility upon librarians to improve the quality and scope of the library's collection.

Library is a growing organism and every year lot of documents are procured. The problem arises when there are more books than available shelf space. In such a situation, ways should be found of storing some of the less used documents in dormitory. It therefore becomes difficult to decide which documents should be relegated to such 'cold storage', as some users would be put to inconvenience by such an action.

There is another factor which is already giving University librarians headache- the increase in the number of users from the student community. The space available for reading is getting less and less, every year, as the number of students is increasing. It is always the desire of the librarian that maximum number of students should use the library, and as such they are attracted with the 'new arrivals' posters, orientation week, etc. Once the target is achieved, the librarian finds his limited reading space crowded with readers and sleepers, the washed and unwashed, the clean shaven and the bearded, etc.

Keeping in view the above problems we can probably foresee only an increasing demand of our resources and facilities. However, the readers' concern as to whether they can do a proper job under such conditions of tremendous expansion is similar to the increasing concern in the University as to whether our students are actually getting the services which we should be able to provide for them.

We do not consider students' use any problem and serve all who come to us as part of our student community. The question arises as to what are the major problems which students of today face in their pursuit of good library services. S.J. Kee in his article, "Identifying students needs and responsibility of the libraries in meeting them" describes four major problems, which demand the attention of the profession as a whole. They are:

1. The deficiencies of libraries
2. Jurisdictional boundary lines that limit the extent of use of the existing library resources.
3. Shortage and misuse of professional library personnel, and
4. Lack of communication among those in responsible positions of providing for the educational needs of students.

Deficiency

The needs for more books and other materials, staff and physical facilities are staggering. The deficiency problem is lack of adequate financing for libraries.

Jurisdiction

Librarians long ago accepted the proposition that education is the concern of the government, and libraries are a fundamental part of the educational process.

In any case, a student today, as mobile he is, is apt to try to cross a number of jurisdictional lines in his pursuit of information and other types of library service. In so doing he runs into a discouraging, even frustrating entanglement of library use regulations.

Personnel shortage

There is a shortage of qualified personnel and, at the same time, there is misuse of the available qualified personnel also. The separation of professional and non-professional work and the possibility of centralizing library operations and employing technology to reduce man-power needs, are receiving less attention by the profession.

Communication

There is a lack of communication so far as availability of library services are concerned. This becomes more acute as the number of library users and the demand for library services increase.

POSSIBLE SOLUTIONS

Keeping in view the above problems, let us examine what steps the Library is taking to overcome them and what remedial facilities it is going to provide to the academic community of the University.

Some of the major problems like inadequate qualified personnel, inadequate finance and introduction of technology in the library services are beyond the reach of the library keeping in view the cost involvement of such project. Some of the efforts of the library in this regard are:

Library User's Guide and Orientations

A guide to the use of the library, giving detailed information about the rules and services is supplied to each new entrant to the University community. This guide gives in brief about the setup of departments, of the academic year, an orientation week is organised by way of lectures, visit of the library and distribution of hand outs.

SERVICES

The library has the privilege of having specialized departments of East Africana, Law, Periodicals, Microfilm and Special Reserve, under the charge of senior and well qualified staff. Special Reserve Collection is a closed access sequence and is manned by a staff from 7.30 a.m. to 10.30 p.m. The rare documents and the books in great demand are restrictively issued for 3 hours.

The library provides services to readers from 7.30 a.m. to 10.30 p.m. A special "Reference Desk" has been established to satisfy the immediate quaries of the users. This desk is manned by a senior qualified staff in rotation all the time.

Decentralized Cataloguing and Centralized Public Catalogue.

Earlier, all library materials were processed at the main library for all the centres (Faculty of Agriculture, Morogoro and

Muhimbili Medical Centre Library) but due to the increase of documents and need for immediate services by these centres, the processing was decentralized. Each department within the main library and campus, was assigned the job of processing books for their respective use. Even the acquisition program is also handled by the different centres. At the main library, the following departments do their own processing:

1. East Africana Collection.
2. Law.
3. Periodicals.

The Library maintains a central public catalogue for the use of the academic community. It files the catalogue cards (author and subjects) for all the books processed at the following Centres/Departments.

		Abbreviation used.
1.	Muhimbili Medical Centre, Dar es Salaam.	MED
2.	Faculty of Agriculture, Veterinary, Morogoro.	AGR
3.	Museum Library, Dar es Salaam.	MUS
4.	Institute of Marine Science, Zanzibar.	MAR
5.	Law Collection.	LAW
6.	East Africana Collection.	EAF
7.	Periodicals Collection.	PER
8.	Microfilm Collection.	MIF

This enables the readers to know where a particular publication is available. This is a service which has been made available to the academic community at a considerable cost to the library in the form of staff and finance.

Further, the library issues an Accession Bulletin at regular intervals which depicts the material added to the collection.

Flexowriter

The library uses unit card entries for cataloguing, for which quite a number of entries with the same information are required for each document. Flexowriters which are simple initial form of automation, are used for cataloguing purposes. This enables the library to speed up processing of documents and saves lot of manpower. The flexowriters are very useful for inter-library document work and services.

1. They can be used for cataloguing purposes in cases where a book is already held by the main library and subsequently procured by another library. The tape of the catalogue cards of the book can be sent to the library, in order to avoid fresh processing of the book.

2. In case copies of portions of a book or an article in a periodical is in demand by another library, then instead of sending the whole document, a tape can be sent to the library. This saves the cost of postage involved and the book from damage in transit.

Centralized Acquisition Programme

Books and other documents are procured by the main library and other three centres individually. Similarly, periodicals are subscribed by them individually. This involves a lot of correspondence, manpower, resources, and duplication in processing. It is suggested that the central library should subscribe to the periodicals for all the campuses under its control. This will speed up the work and will be able to tackle the problems at one point, such as, tracking of missing issue and non-receipt issues, sending of reminders, etc.

CONCLUSION

Library service is unspectacular, but not an insignificent contribution by the University to the economic, intellectural and social welfare of the community. We prefer to regard such services as opportunities rather than problems but the time is not far off when the University must take budgetary cognizance of this kind of University service or the Library will have no option but to curtail privileges or to charge for the services.

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A SURVEY OF INTER-LIBRARY LOAN PROCEDURES AND OPERATIONS AT ELEVEN INDIAN UNIVERSITY LIBRARIES

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Inter-library loan is one of the common methods of resource sharing where different categories of libraries can participate. Stresses the need of maintenance of inter-library loan statistics. Describes the inter-library loan programmes and operations of eleven Indian Universities. Brings out the problems involved in such operations and procedures. Provides proposals for the improvement of inter-library loan facilities and includes the borrowing and lending statistics of the universities surveyed.

INTRODUCTION

Inter-library loan involves borrowing from and lending books to other libraries so as to serve the users with those documents which are not available at the parent library. Among the various methods of resource sharing, inter-library loan is one which is most common in use and widely practised. This is the area where, even different categories of libraries can participate to derive mutual benefits. The fast proliferation of literature in different forms and formats on the one hand and rising cost of publications and budgetary cuts on the other hand, demand increased cooperation among the various libraries and information centres. Libraries are the public resources as they are financed out of public funds in most cases. Hence it is necessary that these resources may be accessible to the public. Every individual must have access to documents of his interest no matter wherever they may be located. Moreover, all the documents at one place do not find their readers. Their appropriate readers may be available in different geographical locations. Hence the whole of the collection of a library is not the usable one. In a study of book use in large academic libraries, Fussler and Simon found that if the least used fifty per cent of a collection were removed, ninety three per cent of the books requested would still be available. If the eighty per cent were removed, eighty per cent of the demands would be satisfied. Other studies have shown that except for language and literature titles, foreign language materials are also relatively little used [1]. An eminent researcher is always in a continuous haunt for any relevant piece of information in his area of interest. He may not be able to read all the documents, but he would like at least to scan through them. A researcher generally has curiosity to acquire the documents available at other places, though he may not be able to read all those already with him and the documents received may not always be much relevant. Some of them may be just attractive titles with no suitable substance.

In order to study the procedures and operations involved in inter-library loan a questionnaire was circulated to eleven universities. The response was received from all of these universities. Besides sending back the questionnaires, duly filled, they also sent their proformas and other forms and copies of regulations regarding inter-library loan.

RESULTS OF SURVEY

In most of the universities surveyed, in the present study, the member is asked to deposit some amount to meet the postal charges both ways i.e. receiving and sending back. However, at Nagpur University the postal charges are paid by the library provided the borrower is a teacher or a research scholar and his request is duly recommended and forwarded by the head of the department or the guide concerned. On the recommendation of the Panjab University Library Committee, the Vice-Chancellor of the Panjab University sanctioned in June 1977 Rs. 3,000/- to cover the postal expenditure for inter-library loan for the faculty members and research scholars provided the loan request is duly recommended by their heads of departments [2]. Later on this facility was discontinued and presently the teachers and research scholars have to pay to get the documents on inter-library loan. The statistics of Panjab University reveal that the number of inter-library loan requests was maximum during the period when the teachers and research scholars were offered free facilities and later on when this privilege was withdrawn, the number of requests declined.

Table I : Borrowing and lending statistics of P.U., Chandigarh.

Period	Borrowing	Lending
1970-71	16	197
1971-72	00	349
1972-73	00	356
1973-74	00	300
1974-75	9	490
1975-76	17	608
1976-77	32	400
1977-78	47	468
1978-79	82	487
1979-80	11	224

At Vikram University, Ujjain the borrower is required to pay half of the expenses involved in the loan process, the other half being borne by the library.

The type of materials issued vary from library to library. The Aligarh University Library would like to borrow books, journals, theses and manuscripts as is evident from the proforma of their inter-library loan. The Banaras Hindu University lends books and dissertations if more than one copy is available for loan. Normally, they do not send reports and periodicals on inter-library loan. The Nagpur University lends books, periodicals, reports, maps and theses but microforms are not sent on loan.

The Panjab University library does not send dissertations on loan if only one copy is available. Dissertations for which duplicate copies are available are readily sent to the requesting libraries. Usually the rare books and manuscripts are also not lent. For other types of material strict and well defined policies are not framed. The lending sometimes depends upon the nature of the request and type of institution. However, Panjab University is very liberal to lend books to various institutions as is revealed from the Table 1. At Panjabi University, Patiala too, definite rules and regulations are not laid down. The services of inter-library loan are not even mentioned in the Library Handbook of the University. The Mysore University offers facilities of inter-library loan to the institutions/colleges on reciprocal basis. The inter-library loan facilities are not extended to any individual. The request is entertained if it comes through the institution/college concerned. They lend books, periodicals, reports and dissertations. There are no specific rules and regulations regarding inter-library loan facilities. Guru Nanak Dev University, Amritsar is not much involved in inter-library loan as there are not too many of the demands. Most of the books are lent to the college libraries. The requests for borrowing are not well responded. Approximately, one third of the demands for books are responded by the various libraries approached for borrowing the material.

The various universities surveyed have different types of proformas for issuing letters, etc. for inter-library loan and statistics. There is no standardization in this respect. A few universities do not even maintain the detailed statistics regarding inter-library loan. Statistics, if maintained, are very useful for inter-library loan and other library routines in the following ways:

(i) They are the living records of inter-library loan dealings with various institutions.

(ii) They provide information whether inter-library loan services are well publicized or not, i.e. whether the needy readers are aware of such a service rendered by the library.

(iii) They act as records of various problems involved in inter-library loan.

(iv) They help in detecting gaps in the library collection, and also knowing books in demand. This helps in book selection.

(v) They are useful in the improvement of tools like union catalogues.

None of the libraries surveyed is following any other scheme of library co-operation besides inter-library loan. The University libraries are thus functioning in a dire state of isolation with no co-ordination and networking. Even for proper execution of inter-library loan, co-operation is essential in other aspects e.g. co-operative acquisition of material, compilation of union catalogues and laying down policies for loan and sharing of reprographic services.

The loan period varies from library to library. The Jawaharlal Nehru University Library lends books and periodicals to institutions for a period of fifteen and seven days respectively. The material is lent for a period of fifteen days by the Mysore University Library. The Panjab University Library lends and borrows books for a period of one month. There is no definite period of borrowing and lending as is evident from the inter-library loan proforma of Aligarh Muslim University Library. Bombay University Library also reported that definite rules and regulations are not laid down. The other universities did not provide specific information in this regard. In most of the cases the books borrowed are read within the library premises. However, this rule is not followed in certain universities, where books are even lent on borrower's card e.g. Panjab University lends books like this but the instructions of the lending library are respected. If the instructions are provided with the inter-library loan material that books should be read within the library premises, in that case the books are not lent to the borrowers. Many of the universities do not provide reprographic services. The Bombay University Library, however, supplies xerox or microfilm copies from journals and books provided advance payment is made. The bulky and old journals are not sent on loan and xerox copies of the pertinent article is supplied.

Almost all the universities surveyed extend inter-library loan services to the registered members of the library. But at Banaras Hindu University Library this facility is available to teachers and research scholars only. The borrowing and lending statistics of various universities reveal that libraries which are rich in collection are lending more books than they are borrowing (Table 2). The Bombay University Library lent maximum number of documents during 1979-80. The Nagpur and Panjab Universities are also lending much larger number of documents than they borrow.

PROBLEMS

Several problems are experienced in operating inter-library loan services. The root cause of many of such problems is lack of well-defined policies, rules and norms. Every institution has got its own policies for borrowing and lending. Due to lack of uniformity in this respect, it is often imposible to anticipate what sort of reply will be received from a library after the inter-library loan request is sent. Sometimes the document is available in the library but all the copies are issued. Calling back the documents from the members of the library and sending it on inter-library loan for the benefit of the members of some other library is not fair. The process of inter-library loan is thus delayed till the user returns the document back to the library. By that time, the user at the other place who demanded the book on inter-library loan may no longer require it. On some occasions, the document is not issued since it is not traceable due to dislocation caused by open access system or lack of stock rectification. It has been noticed that most of the users in academic institutions who ask for inter-library loan require the document in connection with their technical report or dissertation, as revealed by borrowers interviewed at P.U. Chandigarh. Sometimes the financial problems are involved in inter-library loan dealings, e.g. Panjab University sent a document on inter-library loan by V.P.P. But the V.P.P. was returned by the borrowing library as the document was no more required by the borrower. When the borrowing library was approached for payment, they simply apologised for the inconvenience and replied that they cannot pay due to audit objections. It has been seen that through inter-library loan, equal benefits are rarely derived by the co-operating libraries. The requests largely concentrate on big and resourceful libraries. The resourceful libraries, hence,sometimes decline to cooperate with smaller and less resourceful ones. However, this problem can be solved by facilitating integrated library service and concept of networking.

At times the lending library is not able to trace the document and may have to ask for more details when the complete bibliographical details are not given with the request by the borrowing library. The general official delays for correspondence and delivery of the document also affect inter-library loan. Requests are kept pending and paid attention after reminders are received. The most serious problem is that sometimes the document is received well in time but the client who requested for the loan is not accessible in spite of best efforts.

The statistics of various universities reveal that only a negligible number of users utilize the inter-library loan services. There are certain psychological problems of readers which discourage them to utilize the inter-library loan facilities. The first fear is that the supply of document(s) is in the hands of the lending institution. The postage rates and hence the cost involved is too high especially when the material is to be acquired from abroad. The possessive nature of institutions, the inefficient system of supply of documents and users experiènce of all such problems discourage them to get documents on inter-library loan. Hence they try to find alternative sources e.g. visiting the other institutions for consultation of data, asking a distant colleague to supply the documents, etc.

PROPOSALS

The inter-library loan services and procedures need reexamination and reconsiderations. The following proposals need attention for executing inter-library loan services smoothly and efficiently.

(i) There is need of Inter-library loan-cum-reprographic services. Codes with clear policies i.e. under what conditions the documents are to be sent on inter-library loan and under what considerations the photocopies of the relevant documents are to be provided, should be formulated.

(ii) Once the policies and regulations are laid down, the libraries should strictly adhere to those. Such a system should be developed which may be followed by all the co-operating university libraries.

(iii) Information regarding the inter-library loan facilities and implications from the point of view of users may be circulated among all the departments of a university so that the needy researchers at least may be aware of such services.

(iv) Institutional inter-library loan cards may be issued to introduce the facility of easy loan of documents within the same city.

(v) Postal authorities may be approached for concessional rates for sending the documents on inter-library loan.

(vi) The user may be asked to pay only one third of the total expenditure on borrowing a document. The rest of the amount should be paid by the library and provision for a separate budget head with recurring allocations should be kept.

(vii) While preparing the union catalogues, besides recording the other details, the number of copies of a document available should also be recorded.

(viii) Directories of libraries specializing in different types of collections and covering special subjects should be prepared so that much of time is saved in forwarding a borrower's request to most suitable library.

(ix) A national centre may be established for inter-library loans and all the requests for borrowing material from other countries may be forwarded to this centre instead of directly approaching the libraries at international level.

(x) Before a national integrated system for inter-library loan is developed, the various aspects must be clarified. The various cooperating libraries will have to define which type of material can be lent. Each library will review which category of material is very necessary for meeting the local needs of users and which can be lent or borrowed without affecting the needs of either of the institutions.

(xi) Safe custody and return of documents must be ensured especially for those documents which are rare, precious and not easily available.

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Table II: Inter-Library loan statistics of libraries surveyed

Universities	Year	Borrowing	Lending
Aligarh University	1977-78	NP	NP
	1978-79	NP	NP
	1979-80	NP	NP
Banaras Hindu University	1977-78	242	236
	1978-79	256	252
	1979-80	256	251
Bangalore University	1977-78	240	185
	1978-79	170	200
	1979-80	180	210
Bombay University	1977-78	119	747
	1978-79	187	1185
	1979-80	NP	NP
Guru Nanak Dev University	1977-78	28	3
	1978-79	35	38
	1979-80	9	12
Jawahar Lal Nehru University	1977-78	NP	NP
	1978-79	NP	NP
	1979-80	770	248
Mysore University	1977-78	111	574
	1978-79	61	458
	1979-80	58	211
Nagpur University	1977-78	63	87
	1978-79	47	681
	1979-80	24	687
Panjab University	1977-78	9	459
	1978-79	82	487
	1979-80	11	224
Panjabi University	1977-78	11	19
	1978-79	26	18
	1979-80	40	13
Vikram University	1977-78	18	25
	1978-79	35	42
	1979-80	31	38

NP: Not Provided.

INTER-LIBRARY LOAN PROCEDURES

(Questionnaire)

G.S. Thakur
Lib. Asstt.
I.V. Malhan,
Lecturer in Lib.Sc.

345, Sector 15A
Chandigarh.

My dear

We have undertaken a project regarding 'INTER-LIBRARY-LOAN PROCEDURE' in Indian universities. Kindly supply us the following information regarding Inter-Library-Loan System (ILL) in your Library.

i) Procedure followed regarding ILL

ii) Rules and Regulations of ILL
(Kindly supply a copy)

iii) Type of material lent out : Books/Periodicals/Reports/Dissertations/Microfilm

iv) Any scheme of library cooperation.

v) Who bears the postage expenses: Reader/Lending Library/ Borrowing Library.

vi) Procedure of borrowing the reading material

vii) Number of cases dealt during last three years.

Please supply the data yearwise.

	Borrowing		Lending	
	Request sent	documents received	Request received	documents sent
1977-78				
1978-79				
1979-80				

viii) Any other information you wish to supply.

Kindly also provide your valuable suggestion for the improvement of I.L.L. Services.

With kind regards,

Yours sincerely,

(G.S. Thakar)

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EARTH SCIENCE INFORMATION SYSTEMS AND SERVICES

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Describes some of the important geological information systems and services of the world.

0 INTRODUCTION

Scientists are well aware of explosive growth of literature in all branches of science and technology. It was said that the amount of scientific literature is doubling approximately in every ten to fifteen years. In the field of earth science, the number of periodical articles published during 1960 and 1970 has been estimated at 91,000 and 158,000 respectively (1). GeoRef data base has about 600,000 items in 1980 with an annual growth rate of 50,000. Naturally earth scientists are extremely anxious that they may be unware of the work done previously or being done currently by fellow scientists. There is every possibility of missing the work of others.

The access to earth science literature is difficult due to complexity of sources and the varied forms in which information appears, such as periodical articles, conference proceedings, field reports, laboratory reports, theses, maps, films, imagery, etc. Moreover, the subject itself is a composition of fundamental natural sciences and their branches and directly affects their new developments. That is why earth science investigation requires information from a number of different disciplines. So, relevant information cannot be obtained from a small and easily specified set of documents. Geoscience Documentation in 1969 published a list of 1,500 current serial titles primarily concerned with earth science. The Bibliography and Index to Geology scans about 4,200 serial titles to maintain a comprehensive world record of earth science literature.

1 COMPUTERISED DATA BASE

To cope up with the increasing volume of literature effectively, the concept of computerised data base emerged in early 1960s. A 'data base' is a set of documents or files bearing a relationship to one another, logically belonging together and capable of being used as an entity. The procedures developed to organise data bases, to provide access to them, and to develop products from them for the user can be called an 'information system'. If the computer is used to provide access, to maintain the files, or produce output then it can be called a 'computer based information system' (2). The system is able to handle extremely large files efficiently by providing multiple access points through on-line or off-line.

A bibliographic data base maintains descriptive information about documents. Each document is stored with necessary bibliographic descriptions like title, author, serial number, volume & number, date, page and sometimes abstract. The subject content of the document is represented by some descriptors selected generally from a thesaurus.

2 EARTH SCIENCE DATA BASES

A number of earth science data bases with international/national coverage or confined to a specific field of interest provide a wide range of information services like indexing and abstracting, SDI, bibliography, retrospective search, state-of-the-art-review, translation, referral, document supply, etc. to cater to the needs of the earth scientists. Some data bases provide machine-readable files in the form of magnetic tape on licensing or leasing agreement. Most of the data bases publish hard copy publications corresponding to the data base.

Some of the important systems & services in the field are given below:

Asian Information Centre for Geotechnical Engineering (AGE)

This computerised data base in Bangkok deals with the literature on all phases of geotechnical engineering research and projects which are relevant to Asia. The publication corresponding to the data base is the AGE Digest. It also publishes the AGE Geotechnical Engineering Abstracts (biannual), AGE Current Awareness Service (Quarterly) and AGE Holding List of Research/Technical/Special Reports. The Centre offers SDI, referral, retrospective search and reprographic services.

Australian Earth Science Information System (AESIS)

This computer-readable data base is maintained by Australian Mineral Foundation, Glenside and covers periodical literature, reports, maps, theses, open-file reports, unpublished materials, etc. related to Australian geology. Publication corresponding to the data base is AESIS Quarterly. Annual cumulation is available in microfiche. On-line retrospective search, bibliographic and referral services are also offered.

Canadian Centre for Geoscience Data (CCGD)

This computerised data base is maintained by the Dept. of Energy, Mines and Resources, Govt. of Canada, Ottawa. CCGD is responsible for the development and operation of national information system for Canadian geoscience. The corresponding publication to the data base is Canadian Index to Geoscience Data (bimonthly). This index is derived from the decentralised indexing efforts of the provincial and federal government agencies. It covers reports, periodical literature, maps and theses and indexed according to a thesaurus developed by the Centre. Retrospective search and referral services are offered by the Centre.

Computerised Library of Analysed Igneous Rocks (CLAIR)

This computer-readable data base is maintained by the University of Melbourne and covers the worldwide literature on chemical analysis of igneous rocks. There is no publication corresponding to the data base. The file is available for purchase. Retrospective search and data services are offered.

Geo Abstracts

This computerised data base is maintained by Geo Abstracts Ltd, Norwick. It covers worldwide literature on geography and earth science and publish abstracts of the same. The corresponding (bi-monthly) publications to the data base are (1) Part A: Landform and Quaternary,(2) Part B: Climatology and Hydrology,(3) Part C: Economic Geography,(4) Part D: Social and Historical Geography,(5) Part E: Sedimentology, (6) Part F: Regional and Community Planning, (7) Part G: Remote Sensing and Cartography, and (8) Geophysical Abstracts.

It offers literature search and referral services.

Geoarchive

This computer-readable data base is produced by Geosystems, London and covers international geoscience literature since 1969. Data is selectively extracted from the literature on mineral and production of petroleum reserves, stratographic names, new minerals, names of new taxa. The corresponding publications to the data base are (1) Geotitles Weekly - a current awareness service arranged by subject (ii) Bibliography of Vertebrate Palaeontology (Quarterly) (iii) Geocom Bulletin (bimonthly) - abstracts and news about geomathematics and geoscience methodology (iv) Geotitles Reportirum-computer output microform (COM) cumulated index to Geotitles Weekly since 1969. Entries are indexed according to Geosaurus thesaurus. The Geoarchive can be accessed in three ways (i) through Lockheed/DIALOG, either on-line or in batch mode (ii) through Geo Archive profile, both retrospective and current (iii) through lease of the Geoarchive magnetic tapes. Translation, current awareness and retrospective search services are offered by Geosystems.

Geological Reference File (GeoReF)

This is a computer-readable merged data base and contains records of the following source data bases (i) Bibliography and Index of North American Geology 1961-70, (ii) Geophysical Abstracts 1966-71; (iii) Bibliography and Index of Geology Exclusive of North America 1965-66. It claims worldwide coverage of all aspects of the geoscience literature since 1961. It is maintained by the American Geological Institute, Virginia. The corresponding publications to the data base are (i) Bibliography and Index to Geology (monthly), (ii) Bibliography and Index to Micropalaeontology (monthly), (iii) GeoRef Serials and KWOC Index - Lists of serials cited since 1967 in microfiche. Entries are indexed according to GeoRef thesaurus. GeoRef can be accessed through SDC, either on-line or batch mode. Retrospective and current file in magnetic tapes can be procured on licence agreement. The Institute offers SDI, bibliographic and retrospective search services.

Geological Science Literature Information Service

(Geowissenschaftlicher Literaturinformationsdienst)

This computerised information system is maintained by Federal Institute for Geosciences and Natural Resources. It is responsible to provide national and international geological literature to the German earth scientists. The system also offers information from the PASCAL earth science file in the German language. It publishes Journal of Geological Science (Zentralblatt für Geologie) - an abstract journal covering articles on geology that appear in German periodicals. On-line retrospective search and SDI services are offered.

Geothermal Resources File (Geotherm)

This computerised file of worldwide literature concerning the geological and hydrological nature of geothermal resources is maintained by the Office of Resource Analysis, V.S.G.S. Machine-readable tapes are available on request.

Japan Information Centre of Science and Technology (JICST File): Earth Science, Mining and Metallurgy.

This computer-readable data base is maintained by JICST, Tokyo and covers worldwide literature. The corresponding publication to the data base is the Current Bibliography on Science and Technology: Earth Science, Mining and Metallurgy (semi-monthly). On-line information retrieval, SDI, translation and reprographic services are offered by the Centre.

Meteorological and Geophysical Abstracts (MGA)

This computer-readable data base is maintained by American Meteorological Society, Boston and covers worldwide literature on meteorology, physical oceanography, surface water hydrology, glaciology and related fields, since 1970. The corresponding publication to the data base is Meteorological and Geophysical Abstracts (monthly). The Data base can be accessed on-line through Lockheed/DIALOG. Retrospective and current files in magnetic tapes can be procured on licence/lease. Referral, retrospective search and bibliographic services are offered.

Oceanic Abstracts

This computer-readable data base covers significant literature from all over the world on all major ocean-related topics since 1964 and is maintained by Data Courier Inc, Louisville. The corresponding publication to the data base is Oceanic Abstracts (bimonthly) (formerly known as Oceanic Index , Oceanic Citation Journal) The Data base can be accessed on-line by IRS, LIS, SDCs, batch mode by NERAC. Current and back files are commercially available.

PASCAL

This computer-readable data base is maintained by Centre de Documentation Scientifique et Technique du Centre de National de la Researche Scientifique, Paris. It has several sections with worldwide coverage since 1972. The Centre offers reprographic and translation services. PASCAL 120- Astronomy, Space Physics, Geophysics

The corresponding publication to the data base is Bulletin Signaletique 120 - Astronomy, Space Physics, Geophysics (monthly).

PASCAL - 161 - Crystallography

It covers literature on structure of liquid and solid crystallography. The corresponding publication to the data base is Bulletin Signaletique 161 - Crystallography (monthly).

Petroleum Abstracts (TULSA)

This computer-readable data base is maintained by the University of Tulsa. It covers since 1965 world's technical literature relevant to the exploration of gas and oil, geology, geophysics, geochemistry. The corresponding publication to the data base is Petroleum Abstracts (Weekly). Current and back files are available commercially. On-line access to the data base is provided by SDC.

Rock Information System (RKNFSYS)

This computer-readable data base is produced by Geophysical Laboratory of Carnegie Institute, Washington, D.C. It covers literature on Cenozoic volcanic and associated hypabyssal rocks. No publication corresponding to the data base is issued. The Laboratory offers data analysis and bibliographic services.

Rock Mechanics Information Service (RMIS)

This computer-readable data base is maintained by RMIS, London and covers worldwide literature on rock mechanics, soil mechanics, fracture mechanics, engineering geology and related aspects of mining since 1968. The corresponding publication to the data base is Geomechanics Abstracts. The Data base can be accessed on-line or batch mode.

Underground Excavation and Rock Properties Information (UERPIC)

This computer-readable data base is maintained by the Centre for Information and Numerical Data Analysis and Synthesis, Illinois. It covers world literature of mechanical, thermophysical, electrical and magnetic properties of selected rocks and minerals, tunneling and other underground excavation since 1945. No corresponding publication to the data base is issued. The Centre offers bibliographic and retrospective search services.

World Data Centre A (WDC-A): Glaciology

This data base is maintained by the Institute of Arctic and Alpine Research, Colorado. It covers literature on mountain glaciers, glacial geomorphology, snow hydrology, etc. The publication corresponding to the data base is Glaciological Data. The Institute offers data analysis, retrospective search and reprographic services.

Geological Survey of India has been maintaining a data base on Indian geology and allied fields since 1955. The corresponding publications to the data base are Library Bulletin (monthly) and Indian Geoscience Abstract (annual). The library offers SDI, retrospective search, bibliography, translation and reprographic services.

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THE INFORMATION PROFILE OF A PLANT PATHOLOGIST: A BIBLIOMETRIC STUDY

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The present paper attempts to study the works of an internationally reputed plant virologist (Indian born) settled in Canada. It is a bibliometric study of his works (68) and their impact on the world literature through Science Citation Index (SCI). Certain conclusions arrived at are discussed.

Plant pathologists are scientists dedicated to the prevention and control of crop diseases that reduce the food, fibres and other products needed to sustain our civilization. It will be worthwhile to examine closely the research efforts of the plant pathologists, the results of which are generally published in the learned periodicals or presented in national and international conferences. It will indeed be useful to study the literature of such an important and useful branch of science. A citation analysis of the references generally appended at the end of these papers in the field can be of immense importance and may lead to some interesting results.

The nature of the literature of any scientific field can be studied from two angles. First, it can be studied through its secondary periodicals i.e. abstracting and indexing periodicals, etc. It means that the source of study can be "Biological Abstracts" in case of biological sciences pertaining to certain period. It can be further evaluated with the help of certain measuring tools like Science Citation Index. For evaluating any article, citation studies are useful. The main patterns that emerge from such studies are:

- How scientists cite each other.
- An important work may be cited by many authors.
- Any work not attracting much citations is either due to nascent nature of its field or the work is of local interest.

The other way of studying the literature of a field is to study the works of individuals who are eminent in the field. The impact of works of such persons in the form of original articles published in reputed journals or papers presented at conferences can be seen through the Science Citation Index (SCI).

The present paper is a study of such an individual scientist's papers as seen through the SCI. Dr.R C Sinha was requested to send his bio-data with a list of publications. The other authors with whom Dr. Sinha worked as co-authors have also been taken into consideration. The following details have been drawn from his bio-data and his work.

Name	Dr.R.C.Sinha
Current address	Principal Research Scientist Head, Virus-Mycoplasma Program Chemistry and Biology Research Institute, Agriculture Canada, Ottawa, Ontario(CANADA).
Qualifications	D.Sc.London University(U.K.)
Research experience	23 years
Number of publications	54 papers in journals and 14 conference papers.

INFORMATION PROFILE OF A PLANT PATHOLOGIST

Membership of Professional Association	1. American Phytopathological Society 2. Canadian Phytopathological Society. 3. Indian Phytopathological Society. 4. International Organization of Mycoplasmologist. 5. International Committee of Nomenclature of Viruses 1972-75.
Honours & rewards	Associate Editor of "VIROLOGY" 1971-74.

The following is the break-up of the 54 papers published in various journals and 14 papers presented in national and international conferences:

National conferences	8 papers
International conferences	6 papers
Indian journal	1 article
Foreign journals	47 articles
Chapters in books	6 chapters

Table 1 gives an account of the preference of journals according to the number of papers published.

TABLE - 1 : PREFERENCES OF JOURNALS

Sl.No.	Name of the Journal	No. of Articles
1.	Virology	23
2.	Phytopathology	14
3.	Acta Virology	2
4.	Annals of Applied Biology	2
5.	Annals, Entomological Society of America	2
6.	Journal of Economic Entomology	1
7.	Journal of Ultrastructure Research	1
8.	Hindustan Antibiotics Bulletin	1
9.	Plant Disease Reporter	1
10.	Description of Plant Virus	1

From the above table, it is clear that the main preferences are for Virology (23 articles), and Phytopathology (14 articles). This leads to the fact (a) that these two journals are predominantly devoted to the plant virological research, and (b) these two journals have a better co-relations with other journals in which the articles are published and are cited as references. The other journals which have one or two articles are not so much devoted to the specific discipline of plant virology and they carry also other aspects of plant pathology.

We were also interested to observe the co-relations of the journals in which these articles have been published through the SCI's Journals Citations Report (JCR), 1978. Table No.2 gives the number of articles published in particular year showing the impact factor, Citations during 1972-75, Source Item 1977, and Immediacy Index.

From the Journal Ranking Table, it is evident that Virology and Phytopathology are the two main journals which have been chosen for publishing articles by Dr. Sinha. It can be seen that the impact factor and also the Immediacy Index of the former are higher than those of latter i.e., Phytopathology. The other journals in which only one or two articles have been published are ranging between the normal impact factor and Immediacy Index.

The above fact has been further cleared by the cited and citing tables, the source of which is again SCI - JCR 1978 report.

TABLE - 2 : JOURNAL RANKING PACKAGE (SCI JCR 1977)

Sl. No.	Name of Journals	Impact Factor	Citations in 1972-75 Items	Source Item 1977	Immediacy Index
1.	Virology	3.751	462	477	0.969
2.	Phytopathology	0.907	65	298	0.218
3.	Acta Virologia	0.640	10	78	0.128
4.	Annals of Applied Biology	-------- Not covered in SCI ------------			
5.	Annals, Entomological Society of America	0.520	22	190	0.116
6.	Journal of Economic Entomol	0.619	26	231	0.113
7.	Journal of Ultrastructure Research	2.305	29	124	0.234
8.	Hindustan Antibiotics Bulletin	----- Not covered in SCI ---------------------			
9.	Plant Disease Reporter	0.406	18	328	0.055
10.	Description of Plant Virus	--------Not covered in SCI ---------------			

TABLE - 3 : FOR CITED JOURNALS PACKAGE (SOURCE:SCI JCR 1977)

Sl. No.	Cited Journal	Citing Journal	Total
1.	Virology		13564
		Virology	2907
		J. Virol	1753
		J. Gen.Virol.	723
		P.Natl.Acad Sci USA	497
		Cell	412
		J.Mol.Biol	384
		Nature	231
		Adv.Virus Res.	221
		Mol Gen Genet	211
		Arch.Virol.	199
		J.Bacteriol	167
		J.Biol.Chem	165
		Biochim Biophys Acta	161
		Phytopathology	161
		Int.J.Cancer	151
		Annu.Rev.Genet	143
		Biochemistry-US	138
		Cancer Res	134
		J.Natl.Cancer I	132
		Med Microbiol Immun	130
		Eur J.Biochem	119
		Biochem.Bioph Res Co	118
		Phytopathol Z	115
		Vop.Virusol	108
		Infect Immun	105
		Intervirology	95
		Microbiol Immunol	95
		Annu Rev Biochem	91
		Febs Lett	90
		Adv.Cancer Res	85
		Acta Virol	82
		All others(405)	3345

2. Phytopathology 4728

Phytopathology	1163
Plant Dis Rep.	564
Phytopathol Z	225
Physiol Plant Pathol	192
Annu Rev Phytopathol	184
Can J Bot	156
Trans Brit Mycol Soc	89
Ann Appl Biol	82
Can J Microbiol	75
Biol Rev	73
Mycologia	73
Hortscience	72
Virology	70
Ann NY Acad Sci	68
J Am Soc Hortic Sci	66
Adv Virus Res	58
N Nematol	51
Crop Sci	44
Can J Plant Sci	43
FAO Plant Protect B	37
Am Potato J	36
Plant Soil	34
Curr Sci India	33
J Gen Microbiol	30
Nematologica	30
All others(220)	1180

3. Acta Virology 525

Acta Virology	100
Vop Virusol	54
Arch Virol	27
J Gen Virol	22
Virology	21
J Hyg Epid Micros Im	18
Infect Immun	16
Pharmacol Ther Pt A	12
Arch Immunol Ther Ex	9
Intervirology	9
Medicina,Buenos Aire	9
J Virol	8
Neoplasma	8
Brit J Exp Pathol	6
Cell Immunol	6
Zbl Bakt Parasit	6
All others (116)	194

4. Annals,Entomological Society of America 1917

Ann Entomol Soc Am	267
Environ Entomol	135
Annu Rev Entomol	99
Can Entomol	97
J Insect Physiol	80
J Med Entomol	68
Hilgardia	53
Entomol Exp Appl	50
J Econ Entomol	49
Can J Zool	45
Z Angew Entomol	43
Mosq News	42
P.Entomol Soc Wash	38
B. Entomol Res	29
ECCL Entomol	29
Adv Invertebr Reprod	26
J Morphol	23
Science	20
Gecologia	18
Ann Soc Entomol FR	17
J Comp Physiol	17
Physiol Entomol	17
Z Tierpsychol	16
Insect Biochem	15
J Nat Hist	15
Appl. Optics	14
Experientia	14
J Stored Prod Res	14
Ecology	13
J Anim Ecol	13
J Exp Biol	13
J Hered	13
Pan Pac Entomol	13
B World Health Organ	12
J Appl Ecol	12
All others(164)	478

5. Journal of Economic Entolomogy 3288

J Econ Entomol	612
Environ Entomol	330
Annu Rev Entomol	245
Ann Entomol Soc Am	184
Can Entomol	180
Z Angew Entomol	101
J Med Entomol	96
Mutat Res	78
J Agr Food Chem	75
Entomol Exp Appl	56
Hilgardia	50
Crop Sci	44
J Invertebr Pathol	43
J Insect Physiol	39
Mosq News	37
B Entomol Res	36
Pestic Biochem Phys	35
J Stored Prod Res	33
Pestic Sci	32
Acs Sym Ser	29
Indian J. Agric Sci	23
B Environ Contam Tox	22
CRC Crit R Food Sci	22
Curr Sci,India	21
Indian J Exp. Biol	21
Euphytica	20
T ASAE	19
All others(227)	805

6.	**Plant Disease Reporter**		1692
		Plant Disease Report	518
		Phytopathology	340
		J Nematol	78
		Annu Rev Phytopathol	68
		Hortscience	61
		Ann NY Acad Sci	43
		Phytopathol Z	40
		J Am Soc Hortic Sci	37
		FAO Plant Protect B	31
		Ann Appl Biol	30
		Can J Plant Sci	27
		All others (99)	418

Table 3 above shows the omission of Journal of Ultrastructure Research, the reason being that it had only one article and it has more than 80 citing journals. This indicates that this journal is of inter-disciplinary nature and it was not worthwhile to list all the citing journals which might have taken a lot of space and would not have served any useful purpose.

From Table 3 two inferences can be arrived at - (1) Virology is a journal which is exclusively devoted to the discipline and (2) that plant virology is a coherent corpus of knowledge like other areas like Physics, Chemistry, etc.

After looking into the journal preferences and the justification of publishing 24 articles in a particular journal i.e. Virology, we were naturally interested in looking into the citation pattern of Dr. Sinha i.e. how many articles of Dr. Sinha have been cited by his fellow colleagues in the field of virology. This was done by studing 'Citation Index' part of SCI under the name of Dr. Sinha. The Citation Index for the years 1960 to 1978 were consulted. It was not difficult to study this tool as five year cumulations of Citation Indexes were available.

CITATION ANALYSIS

The technique of citation analysis has been used to evaluate the contributions (54 articles) of a plant virologist. This study could also observe the life span of the articles up to which they were cited. The period covered is 20 years. Method of the study is very simple, the search is through the surname of the author i.e. Sinha, R.C. The tool used is the five-year and annual cumulations e.g. five-year cumulations of citation index for the period 1960-64, 1965-69 and 1970-74, and annual cumulations for the period 1975 to 78.

The study is divided into two sections. One section deals with articles which the author has contributed as main author and the same articles cited by others have been tabulated. The second section of the study is the analysis of the articles which the author has contributed in collaboration with other authors. The results arrived at have also been tabulated in another table. The purpose of studying these articles into two sections was to get the overall picture of the author's contribution in the field of plant pathology in general and plant virology in particular.

Table 4 shows the life span and frequency of the citations of articles of Dr Sinha as the principal author. Thirtyfive articles have been analysed. The table shows the lifespan of the articles and number of times these are cited. It has been observed that one article has been cited 31 times. One article was cited only once. It was interesting to note that an article of 1958 was cited in 1976 after the span of eighteen years. This leads to the conclusion that an article may be cited after a long time depending upon the nature of the work and further research in future. This may further lead to the conclusion that we cannot fix the life span of an article unless the work becomes obsolete or further research in the field may not be possible in near future.

As a co-author, the work of Dr. Sinha was also studied and the results have been tabulated in table 5. The maximum number of citations that an article received was 19 times in the year 1977. The article was published in early 1977.

ARTICLES NOT CITED

Four articles published in the years 1973 (1), 1974 (1) and 1976 (2) have not been cited at all, suggesting that further research on the problem is yet to take place. Citations for two articles published in 1979 could not be located as the SCI for 1979 was not available.

Similarly as a co-author, five articles of Dr Sinha were not cited. They were published during 1966 (1), 1972 (2), 1974 (1) and 1978 (3). It leads to the conclusion that the work of 1966 has not been further carried and for others further research work is yet to come.

It was not possible to study the citations for the papers presented at international conferences as no such tool was available for this purpose.

TABLE 4 : SHOWING THE LIFE SPAN AND FREQUENCY OF CITATIONS PER ARTICLE
(AS MAIN AUTHOR)

Year of Publication of Articles	Analysis of No. of Articles	CITATIONS														Total number of citations		
		1960 - 64		1965 - 69		1970 - 74		1975		1976		1977		1978				
		SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
*1958	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0 +	1 =	1
1960	1	-	7	-	3	-	3	-	-	-	-	-	2	-	-	0 +	15 =	15
1960	1	-	2	-	9	-	3	-	-	-	-	-	-	-	-	0 +	14 =	14
1960	1	3	4	4	4	-	3	-	2	-	1	-	-	-	-	7 +	14 =	21
1962	1	4	7	1	6	-	2	-	-	-	-	-	-	-	1	5 +	16 =	21
1963	1	4	3	-	3	-	3	-	-	-	1	-	-	-	-	4 +	10 =	14
1963	1	7	6	1	1	1	1	-	-	-	-	-	-	-	-	9 +	8 =	17
1964	1	4	11	-	7	-	7	-	-	-	2	-	-	-	-	4 +	27 =	31
1964	1	1	2	1	1	-	-	-	-	-	-	-	-	-	-	2 +	3 =	5
1965	1	-	-	1	4	-	1	-	-	-	-	-	-	-	-	1 +	5 =	6
*1965	1	-	-	1	-	-	-	-	-	-	1	-	-	-	-	1 +	1 =	2
1965	1	-	-	7	9	-	7	-	-	-	-	-	-	-	-	7 +	16 =	23
1965	1	-	-	3	3	-	5	-	-	-	-	-	-	-	-	3 +	8 =	11
1967	1	-	-	-	3	-	3	-	-	-	-	-	-	-	-	0 +	6 =	6
1967	1	-	-	4	3	-	5	-	2	-	-	-	2	-	-	4 +	12 =	16
1967	1	1	1	2	4	-	7	-	-	-	2	-	-	-	-	2 +	13 =	15
1967	1	-	-	2	3	2	7	2	6	-	-	-	-	-	-	6 +	16 =	22
1968	1	-	-	-	1	4	2	-	-	1	1	-	-	-	-	5 +	4 =	9
1968	1	-	-	1	2	2	3	-	1	-	2	-	1	2	4	6 +	12 =	18
1968	1	-	-	3	1	-	1	-	1	-	-	-	-	-	-	3 +	3 =	6
1969	1	-	-	-	3	-	1	-	-	1	-	2	3	-	-	3 +	7 =	10
1969	1	-	-	-	-	6	5	-	3	-	1	1	-	6	4	13 +	13 =	26
*1969	1	-	-	-	-	1	-	1	1	-	-	-	-	-	-	2 +	1 =	3
1969	1	-	-	1	2	2	2	-	-	-	-	-	-	-	-	3 +	4 =	7
1970	1	-	-	-	-	3	13	-	-	-	-	-	-	-	-	3 +	13 =	16
1971	1	-	-	-	-	1	10	-	1	-	2	1	1	-	2	2 +	15 =	18
*1972	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	0 +	2 =	2
1972	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0 +	1 =	1
1972	1	-	-	-	-	-	-	-	-	-	1	-	-	-	2	1 +	2 =	3
1972	1	-	-	-	-	-	5	-	1	-	2	-		-	1	- +	0 =	9
1973	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0 +	2 =	2
1974	1	-	-	-	-	-	-		-	-	-	-	1	-	-	0 +	1 =	1
1974	1	-	-	-	-	-	-		-	-	2	-	-	-	-	0 +	2 =	2
1975	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0 +	1 =	1
1976	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0 +	2 =	2

* Articles not included in the list of Research Papers sent by Dr. R.C. Sinha, but obtained from the Citation Index of SCI.

SC = Self Citations

CO = Cited by others

TABLE 5: SHOWING THE LIFE SPAN AND FREQUENCY OF CITATIONS PER ARTICLE (AS CO-AUTHOR)

Year of Publication of Articles	Analysis of No. of Articles	CITATIONS														Total number of citations		
		1960 - 64		1965 - 69		1970 - 74		1975		1976		1977		1978				
		SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	SC	CO	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1959	1	-	-	-	4	-	4	-	1	-	3	-	2	-	1	0 +	15	= 15
1961	1	-	-	-	1	-	1	-	-	-	1	-	-	-	-	0 +	3	= 3
1962	1	-	-	1	6	-	2	-	-	-	-	-	-	-	1	1 +	9	== 10
1962	1	4	7	-	-	-	2	-	-	-	-	-	-	-	-	4 +	9	=
1969	1	-	-	-	1	-	-	-	-	-	1	-	-	-	-	0 +	2	= 2
1970	1	-	-	-	-	2	5	-	-	-	-	-	-	-	-	2 +	5	= 7
1972	!	–	–	–	–	–	–	–	!	–	–	–	–	–	!	0 +	2	= 2
1973	1	-	-	-	-	1	2	-	-	2	1	1	1	-	-	4 +	4	= 8
1974	1	-	-	-	-	-	-	1	-	-	4	-	4	-	1	1 +	9	= 10
1974	1	-	-	-	-	-	-	-	-	-	1	-	1	-	1	0 +	3	= 3
1974	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0 +	2	= 2
1977	1	-	-	-	-	-	-	-	-	-	-	-	-	-	19	0 +	19	= 19

SC = Self Citations

CO = Cited by others

CONCLUSIONS

From this study it has been proved beyond doubt that Plant Virology/Pathology is a coherent corpus of knowledge like Nuclear Physics, Industrial Chemistry and its literature is well established. Quite a few journals are exclusively devoted to this discipline. SCI as a tool to evaluate works of authors through citation analysis stood the test and can be relied upon for similar studies.

It is suggested that a similar study of the subject of Plant Virology as a whole can be carried out by taking the original articles published in various journals and conferences. The source of such study may be Biological Abstracts and the impact of its literature on the world literature can be studied through Science Citation Index and an overall percentage of the contribution of this branch can be found out which will be an interesting study. Such types of studies have already been carried out in the field of Physics, Chemistry and Building Science and it has been found that these disciplines contribute to the tune of 2.7 percent of the world literature.

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BANGLADESH NATIONAL SCIENTIFIC AND TECHNICAL DOCUMENTATION CENTRE

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Describes how BANSDOC came into being as a national institution. Discusses the importance of scientific and technical information for Bangladesh. Mentions different activities and functions of the Centre and its role vis-a-vis the role of libraries of Bangladesh.

0 BACK GROUND

Bangladesh came into being on the 26th March, 1971, as a republic in South-Asia. From 1947 to 1971 it formed the eastern part of Pakistan. Bangladesh, a new nation, born out of a fiery battle, is facing no doubt innumerable hardships, nevertheless, it is making significant strides in different areas of its development.

Back in 1950s, with the country's emphasis on industrialization, the then Pakistan government laid heavy emphasis on research in science and technology. Consequently, the Pakistan National Scientific and Technical Documentation Centre (PANSDOC) was set up in Karachi in 1957 with the technical assistance from UNESCO and Mr. A.L. Gardner, a Unesco expert, was commissioned to set up the Centre (1). The Centre was a unit of the Pakistan Council of Scientific and Industrial Research (PCSIR) and enjoyed the status of a national centre. A Sub-office of PANSDOC was established at Dacca in the premises of the then East Regional Laboratories of PCSIR in March 1963.

After the liberation of Bangladesh, the Sub-office took over the responsibility of a national centre and was christened as Bangladesh National Scientific and Technical Documentation Centre (BANSDOC). Immediately after the liberation and before the formation of the Bangladesh Council of Scientific and Industrial Research (BCSIR), BANSDOC was under the direct control of the Government. Now it is a unit of BCSIR.

1. FORMATION OF BANSDOC

Soon after the liberation, the Govt. of the People's Republic of Bangladesh laid stress on scientific and technical research and accordingly saught Unesco's assistance in the development of BANSDOC. In response to the request, UNESCO sent Dr. Ahmed Abdel-Hamed Kabesh (A.L.E.) on a one-month consultant mission from December 1974 to January 1975. Dr. Kabesh submitted a report to Bangladesh government at the conclusion of his mission.

Dr. Kabesh in his report presented a survey of the prevailing situation of documentation and information services in Bangladesh and made a series of recommendations for their development, particularly through the strengthening of BANSDOC. Based on National Information System's (NATIS) objectives, the report recommended that the government should define a national policy for scientific and technical information, create a body charged with the responsibility of directing national activities in the field, and make BANSDOC the apex body in the field. Other recommendations dealt with the training and education of manpower, compilation of national inventories of scientific and technical resources and capabilities, research in information science, etc(2).

The recommendations of Dr. Kabesh were considered seriously by the Government and was incorporated in the current five-year plan document of the country for their implementation. Bangladesh Govt. has already taken action in the direction and a new building comprising 25000 sq.ft. is now standing within the BCSIR compound. Now the necessary staff are being recruited and trained in BANSDOC and abroad.

The Govt. has approved a development scheme of BANSDOC, which would cost Taka 16.2 million(3).

2. IMPORTANCE OF SCIENTIFIC AND TECHNICAL INFORMATION AND SCIENTIFIC AND TECHNICAL POLICY OF BANGLADESH.

Scientific and technological information is an essential ingredient for the success of any programme of scientific research and development. In Bangladesh, it has a vital role to play in the country's socio-economic development by way of providing 'know-how' for the transfer and adoption of advanced foreign technologies for the utilization of its national resources.

Bangladesh has been continuously suffering from recurring devastations of flood, cyclone, epidemics and especially facing food shortage and rapidly growing population problem.

To minimize birth rate, increase food production, control flood and other calamities, scientists and technologists of this country should carry out the appropriate research and exact information needs to be supplied to them in time. Information is increasingly being recognised as an important resource for accelerating research and national development at all levels. Today, data and information are perhaps more precious commodity than our natural resources(4).

It is a matter of great pleasure that Bangladesh is considering a 20-year national science and technology plan as an integral part of the national development plan for achieving her developmental objectives. The plan, aims at strengthening the existing facilities and filling up of the vital gaps in order to make the scientific and technical infra-structure more effective in acquiring capabilities for taking autonomous decisions for developmental goals.

Sectional Committees have already been formed under the Chairmanship of concerned ministries. Various Sub-sector task forces for preparing the sectional plans have also been formed. The Committees will be co-ordinated by the National Council of Science and Technology (NCST) headed by the President.

Bangladesh has also undertaken a comprehensive survey of her scientific and technological potential and natural data system. UNESCO and UNDP are assisting in these surveys and planning tasks(5).

The scientific & technical policy makers of Bangladesh need information for decision making and BANSDOC is the apex body which can help planning by providing apt information.

3. SCIENTIFIC AND TECHNICAL ACTIVITIES IN BANGLADESH.

Basically Bangladesh is an agrarian country with jute, called the "Golden fibre of Bangladesh" the principal foreign exchange earner. At the same time, Bangladesh is entering into the industrial world with its small and large industries, like steel plants, textile mills, jute mills, sugar mills, petrochemical complex, fertilizer plants, machine tools factory, paper mills. In addition, Bangladesh is engaged in multifarious research activities through institutions like scientific councils, research institutes and commissions, BCSIR, Rice Research Institute, Jute Research Institute, Bangladesh Agricultural Research Council, etc.

At present 138 research projects are under laboratory investigation in different laboratories of BCSIR. Production of various types of plaster cement from phosphogypsum - a waste material from Chittagong T.S.P. factory and utilization of bio-gas from cow dung and water hyacinth are some of the projects undertaken by the Council(6). The above facts depict scientific and technological activities in Bangladesh as well as provide an idea of the information requirements of her scientists & technologists.

4. FUNCTIONS OF BANSDOC

BANSDOC is a national documentation centre under BCSIR. It provides all scientific and technical workers in Bangladesh full access to the world's literature in their respective areas.

4.1 Users

The services of Bansdoc are available to all scientific and technical workers in Bangladesh whether in government service, universities or in industries.

4.2 Subjects covered

The field covered by Bansdoc comprises all natural sciences plus engineering, agriculture and medicine.

5. SERVICES

5.1 Document procurement

It endeavours to obtain a microfilm or photocopy (as desired) of any published scientific or technical paper, on receipt of an order giving full bibliographical details.

5.2 Bibliography Compilation

On request, it compiles a short list of articles on any subject.

5.3 Translation

On request, it undertakes translation of scientific/technical papers into English from the major European languages such as German, French, Russian, Spanish, etc.

5.4 Scientific Slides

On request, it makes slides of scientific figures or illustrations.

5.5 Scientific Contacts

Scientists wishing to know who else are working on their subjects may apply for a list of such persons to be compiled by Bansdoc.

5.6 Answers to Questions

BANSDOC answers queries relating to published scientific literature. No amount is normally charged for answering queries.

5.7 Bibliography for Symposia

BANSDOC considers requests for the compilation of a comprehensive bibliography covering the field of a symposia.

6. REGIONAL AND INTERNATIONAL CO-OPERATION

BANSDOC is humbly contributing to the International programme for co-operation in the field of scientific and technological information in accordance with the UNISIST programme of Unesco. The institution has been designated as the national focal point of UNISIST/UNESCO.

It has agreement with countries of South & Southeast Asia including India for the exchange of scientific and technological information. It is also the national liaison office for the AGRIS project of Food and Agricultural Organization of the United Nations. Input sheets of Bangladeshi materials are being sent to AGRIS Head office in Rome through the Agricultural Information Bank of Asia (7).

It hosted a meeting of the Regional Standing Working Group on Information in South & Central Asia in December 12/14, 1977. This was the second meeting of the Group, the first being held earlier at New Delhi where three delegates from Bangladesh participated, including the Chairman of the BCSIR, Prof. M. Ahmed. Mr. B. Guha of INSDOC attended the meeting on behalf of India.

7. PUBLICATIONS

a) Scientific and Technological Institutions of Bangladesh.

b) Scientific and Technical Periodicals of Bangladesh.

c) Directory of Scientists and Technologists of Bangladesh.

d) Bangladesh Science and Technology Index (Annual).

e) National Catalogue of Scientific and Technical Periodicals for the entire country is under compilation.

It conducted a national workship for the users of scientific and technical information. The Workshop was held in BANSDOC building on February 13 and 14, 1979. Mr. T.N. Rajan, Officer-in-Charge, Training Course in Information Science, INSDOC, assisted in the conducting of the Workshop as an Unesco expert.

An SDI (Selective Dissemination of Information) service for the scientists and technologists working in different institutions and organization in Bangladesh is an imperative need of the present, which needs to be fulfilled.

Not many good libraries are there in Bangladesh. However, a good number of special libraries, some of them fairly big & rich are attached to the following institutes of Bangladesh, i.e. Bangladesh Institute of Development Studies (BIDS), Dacca; Bangladesh Accedemy for Rural Development (BARD), Comilla; National Medical Library, Dacca; Bangladesh Atomic Energy Commission, Dacca; National Institute of Public Administration (NIPA), Dacca; Bangladesh Small Industries Corporation (BSIC), Dacca; Bangladesh Agricultural Research Council (BARC), Dacca. In addition, there are small libraries throughout the country(9). The foundation stone of the National Library of Bangladesh has already been laid down & it is likely that the Library will be established before long.

Bansdoc, being a new institution, will take time to develop its own resources to render effective & prompt service to its clientele, and as such it will have to depend heavily on the resources of the libraries mentioned above for quite some time. This presupposes active cooperation between Bansdoc and these libraries and also the proper organisation of materials in those libraries so that anything wanted on inter-library loan basis by Bansdoc can be easily retrieved & loaned without any delay. Compilation of location tools, like union catalogue of books & periodicals, will also help to a great extent in fulfilling the information requirements of the scientists & technologists.

It is hoped that BANSDOC and our national library system will go hand in hand to help our scientists & technologists to have an access to the whole world literature, using which our scientists, technologists & intellectuals will transform our poverty-stricken country into a land of smiling faces & plenty.

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MICROPROCESSORS AND WORD PROCESSORS—THEIR USE IN INFORMATION RETRIEVAL SYSTEMS

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Computer technology has been playing a vital role in shaping the activities concerning collection, processing, packaging and dissemination of information. The innovation of microprocessors and word processors is stated to be a major breakthrough in computer technology. A brief description of microprocessors and word processors has been provided with the objective of bringing the capabilities of this equipment, to the notice of information scientists in India, so that their utility may be studied in the context of designing computer-based information systems in India.

0. INTRODUCTION

In library and information work, the decade of 1970's has witnessed a rapid change and development. Technology has definitely begun to make big inroads into areas where customs and traditions scarcely registered any change for decades, and provided the means to transform some long cherished ideas into practical realities. Computer technology has been playing a vital role in shaping the activities concerning collection, processing, packaging and dissemination of information. The innovation of microprocessors and word processors, has had treamendous impact on the design of modern information systems. Concepts like online information systems and information networks could not have come into practice but for the advances made in computer and communication technologies. The objective of this paper is to provide a brief account of microprocessors and word processors indicating their specific utility in the development of data communications systems and information processing functions.

1. MICROPROCESSORS

1.1 Definition

The question of what constitutes a microprocessor has been discussed in the literature of computer science at a greater length and as a consequence, several interpretations have come into being explaining the meaning of this term. Because of this "definitions of 'microprocessor' are both loose and ephemeral, often failing to include devices which might reasonably be considered microprocessors......" /‾4‾/. The reason for this terminological vagueness appears primarily due to the fact that microprocessors do not differ in any real, qualitative way from many other circuit forms except that they represent different structural and functional emphasis in design and purpose of the circuit.

1.2 Main Features

The main features associated with a microprocessor could be summarised as follows:

- i) it is an electronic device
- ii) it consists of one or more large scale integrated (LSI) circuits.
- iii) it is a stored program computer
- iv) it is capable of being used both as a replacement for random logic,as well as a processing element in a computer system.

1.21 Microprocessor as a logic device

A microprocessor is an electronic device which can perform all the functions previously performed by discrete logic circuits. The difference being that in the discrete units random logic had to be wired together to perform a given fixed function, while a microprocessor can be used to process logical and arithmetic data to provide a number of functions.

1.22 Microprocessor consists of one or more Large Scale Integrated circuits

Integrated circuit technology enables the incorporation of a number of electronic components onto a single small piece of silicon known as a chip. The circuits formed on these chips were termed integrated circuits and the number of individual components which would be fitted into each chip varied as technology advanced. Now, it is possible to have small scale (10 to 20 gates per chip), medium scale (20 to 100 gates per chip) and large scale (100 to 5,000 gates per chip) integrated circuits. The microprocessor is stated to contain one or more large scale integrated (LSI) circuits in its design.

1.23 Microprocessor is a stored program computer

The question as to whether a microprocessor is a computer or merely a component has stirred up much discussion in recent times. But, by and large, it is agreed that a microprocessor corresponds to the CPU (Central processing unit) of a computer and like the CPU, cannot carry out a required task until programmed to do so. The microprocessor has neither memory nor input/output/(I/O) control, but its processing under software control capability is frequently EMPHASISED by calling it a 'stored program computer' in order to differentiate it from other basic components, such as transistors or relays, which respond directly to their electrical inputs without the use of a stored program. [4]

1.24 Microprocessor applications

The role of microprocessor as a component, both in computers themselves and in many types of equipment which require a controlling mechanism (particularly in situations where control must take place in a real-time) is continuously growing. The small size of the microprocessor, its speed and flexibility of functioning make it an essential component increasingly adaptable to use in varied situations, and in a variety of products. Its use in data communications systems is briefly discussed in the following paragraphs.

1.241 Data communications system

A 'data communications system is a physical system that permits information to be transferred between computers and remote terminals or between computers and computers'. In a simplest case, only two stations connected by a single line are involved, for example a remote terminal linked to a central computer. On the other hand, communication networks involving many devices constitute a complex type of communication system.

Figure 1 represents the tasks of components of a typical data communications net work.

Explanation of fig.1

i) The terminal refers to any interface between a human being and the network. A terminal could be a keyboard, or a display device or even a keypunch.

ii) Many terminals could feed into a single communications processor. The functions of a communications processor are: line control, character message assembly, data conversion and data editing and other functions like error control and message buffering, etc.

iii) A modem is an acronym standing for modulation and demodulation. It converts the digitial signals generated by the terminal devices to analog signals capable of being transmitted along a common carrier. At the end of the line is another modem.

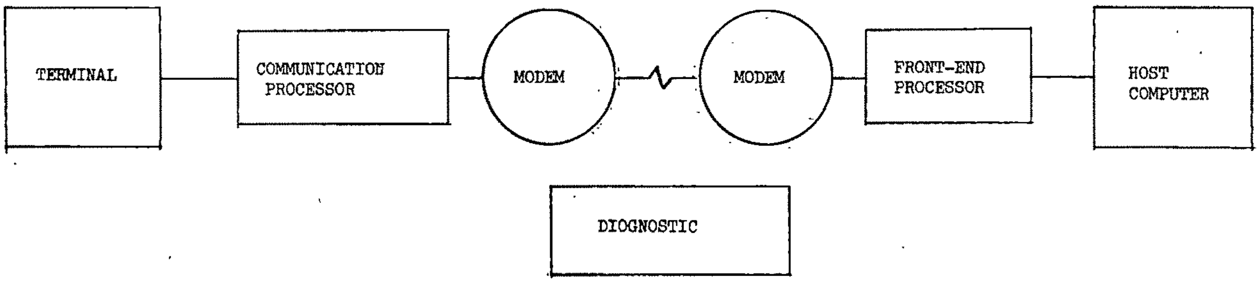
iv) The next component is a Front-End Processor. Its function is to handle the routine communication functions. It is directly connected with the main computer.

v) The diagnostic equipment represented by a separate block in the diagram can be applied anywhere in the network as a preventive maintenance.

The microprocessor has influenced data communications in two different ways. The first is that the application of this technology resulted in the availability of a more reliable and flexible equipment for the existing communications networks. This equipment is capable of relieving the host computer of its load. In another words, the load of the host computer could be shared by some of the devices which make use of the microprocessor technology. The second impact is in a totally new potential usage such as terminals, communication processors modems and other equipment relevant to the design of networks. To make a long story short, 'microprocessors' have affected all aspects of data communications by producing less expensive, and more reliable systems'. [5]. Although, there are many modes to transmit or transfer information, telecommunication is by far the most important one. This is because when digital coding is used, telecommunications technology is completely compatible with the electronic storage and processing devices. The channel capacities are adequate to support the high transfer rates required by information transfer. This is the reason why most of the information networks such as EURONET have adopted the telecommunication technology and have deviced their own protocols for message switching etc. [1].

FIGURE

SIMPLE FORM OF A DATA COMMUNICATIONS NETWORK



2. WORD PROCESSORS

2.1 Perspective

When computers were first invented they were expected to carry out numerical data processing, "which is characterised by data that are usually of fixed length, columnar in format, limited in terms of alphabet,easy to verify, easy to edit and is manipulated by arithmetic operations such as add, subtract, multiply and divide" /̲ 9 /̲. But, the application of this equipment for text processing i.e. capture of data, storage, verification and retrieval of strings of characters (alphabetics data) and to provide output from such data called for a totally different type of capabilities, such as very large use of alphabet and slightly different type of programming techniques, etc. Thus the computer system resources required to store and textual matter are much greater than those required for numerical processing. Text processing has become possible due to a number of developments such as the advent of word processing equipment and packaged software to perform the required functions. In the following paragraphs an attempt has been made to provide a brief account of Word processors and their application in the design and operation of information systems.

2.11 Word Processing

Before we attempt to understand the basic components of a Word processor, it is necessary to know what exactly is meant by the term Word processing. Word processing is a technique, which is used for processing of textual data for purposes of efficiently preparing printed communications. The technique includes such functions as data entry, data editing and validation and data formatting.

2.12 Components of a Word Processor

"A Word processor consists basically of an alphanumeric keyboard, with some special function keys, a letter quality printer, a memory unit, a microprocessor to provide the operating logic, an external storage unit for magnetic storage media and the software for operations and applications. It may also have a display unit capable of showing pages of text. It can share peripherals such as printers, photocomposition equipment" etc. /̲ 8 /̲. Word processors can be intelligent terminals working in a stand-alone configuration or dumb terminals sharing a central processing unit (CPU). In terms of hardware, there is often not a great deal of difference between Word processors and microcomputers. Word processors are designed primarily for the application their name implies and often have controls specially for that purpose. They must have output printers capable of giving high quality word. Some word processors are offered with additional software for applications such as information retrieval.

2.121 Keyboard

All word processors have keyboards.These keyboards have alphanumerical character set along with some special keys,which are used for control functions. Keyboards are used for data entry, data editing, and data validation. The logic which implements these functions is contained in a microprocessor, keyboards can be operated just-like type writers. But, when a word processor is used as computer peripheral or as a communications link in a DATA COMMUNICATIONS system a screen is always associated with the keyboard.

2.122 The Screen.

There are many varieties of screens available. Some screens have the capacity to display only one line of textual matter. Such screens are generally referred to as the window. On the other hand, there are screens which can display a full page (A3 size) of textual matter, which is being input into the system. Most of the screens have a provision on the top area to display control information such as the name of the job being operated, the function that is being carried out, the setting of tabs and margins. This information is of great use to the operator.

2.123 The Print Unit

Every word processor will have a printer. The printer may either be linked to the keyboard device or may exist as a separate physical unit. Generally, two types of printers are in vogue. They are 'golf-ball' printers and 'daisy-wheel' printers. On both these types, a variety of type-faces and character sets could be produced. The 'daisy-wheel' printers are stated to be faster in operation compared to the 'golf-ball' ones.

2.124 Storage capability

Word processors are normally associated with some form of internal magnetic memory. This memory is utilised to record typed information. But, this internal memory is very much limited. So, word processors are equipped with external storage facility. The external storage is usually in the form of floppy disk or diskette system. The floppies have a capacity ranging from 400 kilobytes to 3 megabytes. From the point of view of storing textual matter they can accommodate 50 to 1200 pages. Disks being a direct access media, text can be retrieved from any where at a comparatively faster speed. When in operation, these disks are attached to the system through the disk drives. Word processors may also have magnetic tapes in the form of cassettes as external storage. In such cases, the capacity is generally limited.

2.125 Processing Logic

Processing logic is a very important component of any wordprocessing system. It is the logic in the word processor that facilitates the various functions such as editing, storing searching and retrieving the text. Therefore, the processing logic controls all the components of the system. In some of the earlier systems, part of this logic is in the form of hardware, that is to say in the form of electronic circuits. But, in most of the modern systems the processing logic is in the form of software fed into and stored in the internal memory of the word processors. The software programs are executed by a microprocessor and are generally supplied by the manufacturer of the system.

3. TYPES OF WORD PROCESSING SYSTEMS

Word processing systems could be categorised into 3 groups. i) Stand alone-systems, ii) Linked systems and iii) computer-based systems.

3.1 Stand-alone Word Processors

As the name itself indicates, this category of systems are self contained. They have a keyboard with or without a video display unit (VDU), a print unit and some form of storage facility. If such systems are utilised for the purpose of information storage and retrieval, they must be software based. The stand-alone word processor systems are ideally suited for text editing jobs.

3.2 Linked Systems

The characteristic of linked systems is that they utilise the capabilities of a printer on a shared basis. This type of sharing is made possible by the existence of a mismatch between the processing speeds of keying operation and that of printing. This type of systems will be cost-effective in situations where the keyboard operation is shared by a number of operators for producing a lengthy textual report.

3.3. Computer-based systems

Some of the major companies such as, IBM, HP, etc. have started developing their own word processors and have started supplying word processing software packages to the interested parties. Attempts are still being made by such companies to provide such facilities as better file management techniques and information processing capabilities.

4. APPLICATION OF WORD PROCESSORS

Application of computers to information processing activities has now become synonymous with modern technology. Commercial organisations such as Lockheed, SDC have played a very significant role in the development of computer-based information services. They have developed software packages for searching bibliographical data bases both online as well as in batch modes. Most of the information scientists are familiar with systems like DIALOG, ORBIT, BLAISE etc. International organisations like Unesco and IDRC have also contributed to the development and use of packages like ISIS and MINISIS, which could be used for generating information services from either internally created data bases or from those available on commercial basis. The search facilities associated with the word processing systems, make this equipment ideally suited for information processing activities such as 'text searching', 'text storage' etc. Apart from these activities, word processing systems are being used in library house keeping activities such as cataloguing and indexing.

4.1 Text Searching:

The traditional approach to retrieval of bibliographical information involves indexing performed by people (manual indexing). Each document entering the collection is read or scanned by a person with appropriate subject and information science knowledge and is assigned a set of words or phrases, which represent its content for retrieval. During retrieval, only those 'indexing sets' are searched. In text searching, a document is not manually indexed rather a computer generates "text index Set", which contains every word occuring in the document except articles such as the, of and etc. During retrieval the "text index sets", are searched. This particular procedure has an advantage in that it does not suffer from the selectivity associated with manual indexing. Most word processors are capable of searching textual data from their data store and can display the information retrieved on the screens Usually, word processors require a software program to access information stored in the external storage attached to them. Such software packages are now being supplied by some of the firms.

4.2 Text storage:

The major considerations concerning the storage facilities of word processors are: The capacity available to hold information and the methods associated with its filing and indexing aspects for retrieval purposes. These aspects have a direct bearing on the size of a document or documents which could be manipulated at any given time. Knowledge of the storage facilities helps the users in a proper utilisation of the system.

4.3. Information storage and Retrieval:

There are two types of applications in this category. Word processing systems could be used as intelligent terminals to retrieve information from internal or external data bases mounted on a main frame computer systems. Once the required information has been captured, then these systems offer the capability of reformatting it in various ways". The information could be 'customised' either for an individual or for a group. A whole range of information gathered from various source can be combined on the word processor, to produce a single bibliography" / 2 /. Word processors may also be used as self-contained retrieval systems. In this case, a software package is necessary to operate the system. By using this facility one can provide full text retrieval. The system can search each document using keywords or descriptors. The results of the searches could either be displayed on the screen or could be printed with the help of a printer as an out put.

Word processors are also being used in online searching and to provide access to data bases, externally generated by using communications mode. Many SDI services are utilising the potentialities offered by the word processing systems.

5. CONCLUSION

In India, computer applications in libraries and information centres have been very limited both in scale and type. This is mainly due to the high price associated with computer equipment and its operation. The innovation of microprocessors and word processors is a major break through, and for the first time, offers an opportunity to purchase a dedicated computing facility for a library or information centre with relatively a low budget. Many people in other countries find this prospect encouraging for altering the way our profession carries out its work. This potential should carefully be assessed and its suitability to Indian conditions examined properly, specially in the present situation when India is trying to develop its information system for science and technology.

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LIBRARIES AND LIBRARIANSHIP IN SWAZILAND

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Describes various types of libraries in Swaziland. High-lights basic problems in library development in that country. Suggestions for improvement of the present situation are outlined alongwith recent moves by the Government to improve the state of information activities.

0. INTRODUCTION

Swaziland became independent on 6 September 1968. It is a landlocked country with Mozambique on its eastern boundary and South Africa bordering her on the north, west and south. Next to Gambia in West Africa, Swaziland is the smallest country in southeast Africa. The country occupies an area of 17365 km^2. The country is divided into four main topographical zones. To the west is the highland mountain area interspersed with rivers called the high-veld (1066-1370 metres altitude). Running down the centre of the country is the middle-veld (1600 - 760 metres altitude) which has many beautiful valleys, low mountains and streams. Further east is the lowland swampy bush called the lowveld (150-3001 meters altitude) and to the far east is the Lubombo Plateau, a narrow escarpment with an altitude similar to the middle-veld. Climate of the country varies greatly from cold misty weather in the high-veld to semi-tropical conditions in the low-veld. The main rivers of the country cross all four regions from west to east enroute to the Indian Ocean making Swaziland the best irrigated area of the region. The two largest towns of Swaziland are Mbabane and Manzini. Mbabane, with a population of some 25,000 is in the highveld and is the capital and administrative centre of the country. Manzini with a population of some 27,000 is mainly industrial centre and serves the important middle-veld agriculture. Other regions such as Big Bend, Mhlume, Tshaneni Bulembu (Havaelock mines), Siteki and Pigg's Peak, although smaller in population hold considerable importance to the agricultural economy of the country.

According to the 1976 census the population of the country was 522,512. With an estimated 3 per cent annual growth rate, the population in 1977 was approximately 540,000. Almost 90 percent of the population is made up of Swazis, some 6 percent non-Swazi Africans, 2 percent European and the rest of various racial groups. English is the official language of the country.

1. LIBRARIES

Recognition of books and libraries as essential elements in the educational process is a recent development in the African continent. The present study is based on author's foreign assignment for library service in Swaziland. Library situation in the country would show that there are a good number of libraries in the country in various stages of development ranging from the well-organised National Library Service down to the rudimentary libraries like those of CODEC (Cooperative Development Centre) and SEDCO (Small Enterprises Development Corporation) that are being managed by non professionals or clerks.

There are mainly three major types of libraries in the country. These are the Swaziland National Library Service (hereafter called SNLS), the University College of Swaziland (called UCS) Library and groups of special libraries, like the (Swaziland Institute of Management of Public Administration) SIMPA Library, together with a number of smaller Ministry or departmental libraries in different developmental stages.

1.1 Swaziland National Library Service(SNLS) is the largest library in the country that gives a nation-wide double purpose service. The SNLS performs the functions of a public library, as well as, some functions of a national library. Like most English speaking African countries, this service was established after the independence with the help of the British Council and the British Ministry for Overseas Development which provided funds for building the National Library building, as well as for purchase of books, furniture and equipment. The SNLS had its first director appointed in 1971 with headquarter located in Manzini, and branch libraries at Siteki, Nhlangano, Mankanyane, Pigg's Peak, Big Bend, Hlatikulu, Mhlume, Bhuniya and Tshaneni.

The SNLS is under the administrative control of the Ministry of Local Administration and is housed near the Manzini Civic Centre in a single storey building having good ventilation and lighting systems. The building plan for the library allows ample scope for future physical expansion without in any way interrupting the library services. The National Library building provides for the following:

(i) adult reference service, (ii) the children's lending/reference service, (iii) school library service (iv) office for the Director, SNLS, (v) technical processing section (vi) staff welfare facilities, e.g. staff-room, toilet etc. The Library offers its users reading/reference and lending facilities. The main reading room of the SNLS has a seating capacity for about 70 readers.

The Library had a collection of over 55,800 volumes, including fiction and children's collection, and subscribed to 155 periodical titles at the beginning of 1974. There were special collections on Swaziland material (about 300 publications) and librarianship. The SNLS and in fact most of the country's libraries use Dewey Decimal Classification. The number of registered borrowers in 1974 in the SNLS, Manzini stood at 3016 and in the branch libraries and mobile library was 5100 approximately. The SNLS has established inter-library loan arrangements both with the State Library Pretoria (Republic of South Africa) and the British Library Lending Division (BLLD) in the U.K. One large mobile unit (book mobile) and two smaller vans of the SNLS served 28 secondary schools and loaned about 16000 books in 1973-74. The Library had an annual recurrent budget of Rs.600,000 for 1974-75. Future plans for the development of the SNLS include, among other things, the recruitment and training of more qualified staff, constructing a library building in Mbabane, establishing a branch library at Kwaluseni, the extension of mobile and school library services and physical expansion of the existing library buildings including the headquarter in order to increase the seating and shelving capacities of libraries. Presently the SNLS is carrying out only two of the many fundamental functions of a national library, viz. it acts as a depository of the nation's literature output and also plans and coordinates inter-library lending. It should, however, strive to take upon itself other essential functions of a national library, in future plans e.g. publication of the national bibliography and union catalogues, exchange centre for duplicates and lead the professional training and expertise in library techniques in the country. On the public library aspect of the SNLS, the latter should expand its activities to include adult literacy programme in collaboration with the Sebanta National Institute and library extension activities, such as story-hours and club activities which can contribute towards the development of effective communication through speech among children by the use of audio-visual aids. International agencies like UNESCO, SIDA etc could be approached to provide consultative services in this connection.

1.2 University College of Swaziland (UCS) Library Kwaluseni:

Next in order of size and importance follows the UCS library that was built at Kwaluseni in 1974. Earlier in 1971, the University of Botswana, Lesotho & Swaziland started functioning on the Agricultural College campus at Luyengo. The UCS library "is the administrative centre for the campus libraries in Swaziland which include the Luyengo Library, Malkern Agricultural Research Station Library, Lowveld Agricultural Research Station Library and the Nhlangano Experimental Farm Research Station Library". The UCS Library is housed in a newly constructed three-storey air-conditioned building which is functional and has the advantage of proper lighting and ventilation.

The total library collection in 1974 was 22450 volumes with annual subscription of 615 periodicals titles in the UCS library and other branch libraries. The breakup of the collection is as follows:

	No. of Vols.	No. of periodical titles
Kwaluseni	- 12000	235
Luyengo	- 8500	186
Malkarn	- 1650	126
Lowveld	-- 300	68
Total	22450	615

The scope of the collection includes generalia in and subjects covered by the curriculum of various university faculties and departments. Dewey Decimal Classiciation system is used to classify the collection. The number of users including staff members and external borrowers was 360 and nearly 8200 volumes were borrowed in 1973-74. The UCS library had a staff of 12 members including five graduates and others with varying professional or semi-professional qualifications. The lending service of the UCS Library has been extended in Southern Africa. The university staff also avails of the special facility available with the UCS Library for photocopying service for journals available in the BLLD in the UK. The Library has reprographic aids, such as photocopying machine, microfilm reader/printer and microfiche reader which are vital for the document supply service. The UCS library has had the privilege to publish the first ever Swaziland National Bibliography, 1973-76, with the assistance of the State Library, Pretoria. The library also brings out 'Notes for readers', monthly accessions list and annual reports. The library's book budget has increased three times since the inception of the library in 1971-72. The recurrent estimate for this purpose was Rs. 60,000 in 1974.

1.3 Agricultural Libraries:

1.3 The Luyengo Campus : of the University of Swaziland where the Swaziland College of Agriculture is located is about 16 miles from Kwaluseni campus. The Luyengo Library is housed in a separate building and is having a collection of over 6000 volumes in the field of agriculture. There is a seating capacity for 50-55 readers in the library which acts as a depository for the FAO publications.

1.3.2 The Malkern Research Station is the most important of the three Agricultural Research Stations affiliated to the Swaziland College of Agriculture. The library with a collection of over 1650 volumes and 126 periodical titles, besides miscellaneous reports and special publications of the Commonwealth Agricultural Bureaux and the FAO, is housed in a two-room building and serves the readers from Malkern and Luyengo.

1.3.3 - Lowveld Agricultural Research Station at Big Bend has a small library with about 400 volumes and 68 periodical titles and miscellaneous reports on agriculture published in the neighbouring South Africa, the Commonwealth Agricultural Bureaux and the FAO. The library is used by a small number of staff members.

1.4 Special Libraries

1.4.1 SIMPA Library: Formerly known as the Staff Training Institute Library, the current Swaziland Institute of Management & Public Administration (SIMPA) Library aims to specialize in collecting, organizing and diseminating administrative information which usually appears in the form of pamphlets and reports surveys, case-studies and similar other publications generally known as government publications. The library is housed in single big room having a collection of over 6000 volumes and subscribing to about 100 periodical titles in fields like Social Sciences, Management, Public Administration, etc. The library is used by all civil servants, trainees in the Institute and the Institute Staff. The library is managed by two qualified library assistants and has exchange relations for publications with similar institutions in other African countries.

1.4.2. SCOT Library : Swaziland College of Technology Library is housed in a newly constructed spacious building which has good provision for light and ventilation. The library has a collection of over 7000 volumes and subscribes to about 100 periodicals titles in all technical subjects. The total number of readers, including staff stood at approximately 600 in 1975. The library is managed by two qualified library assistants.

1.4.3. William Pitcher Training College Library: The Training college has the objective to train teachers for various schools in the country. The library is housed in a single big room and has a collection of over 10,000 volumes and 10 periodicals titles in the field of Education, Fiction and'Africana'. The 300 users of the library are mainly the students and staff of the college. There is no qualified librarian to manage the library.

1.4.4 Sebenta National Institute Library: The library has reading material in some local African languages and has about 500 volumes, which are mainly literacy publications in addition to booklets, charts, posters and other useful audio-visual material to support the National Adult Literacy Programme. The library is looked after by a non-professional staff member.

1.5. Government Libraries: These are meant to play an important part in the flow of administrative information by collecting relevant published data and often restricted materials for the specialist personnel employed in the civil service.

1.5.1. Economic-statistics library: The Department of Economic Planning & Statistics of the Ministry of Finance has a staff of over 300 civil servants who are the users of the library. The library was established in 1967 and has a collection of about 3000 volumes and subscribes to about 50 periodical titles besides numerous reports and special publications of the U.N., the World Bank, IMF, OECD etc. in, fields such as Economics, Trade Statistics and Demography. The library is managed by a qualified library assistant.

1.5.2. MONAS (Monetary Authority of Swaziland) Library: The Research Department of the Monetary Authority of Swaziland has maintained a small library with a specialized collection of reprints, reports, journals and books on menetary aspect and trade. The library is maintaining a specialized press-clipping service and works in close cooperation with the Economic-statistics Library. The library is managed by a non-professional staff of the Department.

1.5.3. Department of Geology Library: This library has a collection of over 3000 volumes and an equal number of reports and volumes of periodical titles in fields such as Geology, Mining, Engineering and Geochemistry etc. The library is used by civil servants of the Department and is managed by a qualified library assistant.

1.5.4. Ministry of Works Library: This library aims at specializing in collection of publications in Building Technology, Architecture, Hydrology, Transportation Technology and Civil Aviation. There is a collection of 2000 publications, miscellaneous reports and periodical titles yet to be properly organized. The library is being managed by a qualified library assistant

1.5.5. Ministry of Agriculture Library: The library has been established quite recently with the aim of specializing in the collection of Agricultural Sciences and Coordinating with other agricultural libraries for the purpose of bibliographical control and dissemination of information in Agriculture. The library is having about 400 volumes and an equal number of reports and periodical titles in Agriculture and is managed by a qualified library assistant.

1.5.6. CODEC Library: This library is affiliated to the Cooperative Development Centre (Ezulwini) under the Ministry of Agriculture. The library has a stock of about 3000 books, over 100 periodical titles and reports in the field of cooperative movement. The library was established with Swedish aid and is managed by a non-professional staff member.

1.5.7. Attorney General's Library: The library is used by the staff in the Attorney General's office in the Ministry of Justice and possesses a collection of over 3000 volumes and about 15 periodical titles in the field of law. The library is looked after by a non-professional staff member.

1.5.8. SEDCO (Small Enterprises Development Corporation) Library: This library has a small collection of books, reports and journals in commerce, small businesses and industry and is used by the staff of the SEDCO and the Ministry of Commerce & Industry. The library is looked after by a non-professional staff-member.

2. LIBRARY DEVELOPMENTS AND PROBLEMS

Libraries in Swaziland have been held in a very low profile in relation to other essential services and hence the status of librarians in the country is rather low. There had been practically no planning of libraries before the country got her independence from the British in 1968. The importance of libraries and information came to be gradually recognized only with the establishment of the SNLS, the UCS library and a few other libraries, but the country has not granted them significant support because the educationists and top administrators in the country seem to be unaware of the role of the library as an effective instrument for education and decision-making. Hence the library has hardly any place in the national educational programme. This is evident from the fact that the importance of school libraries in the country is not fully recognized. Unless this is done, there will be total lack of library awareness and vital importance of libraries and information for educational effort would remain only at the instructional level and would certainly lack the cultural element which is so important for education. Another characteristic observation about library development in Swaziland has been the greater degree of dependence on foreign aid for capital and recurrent library expenditure and the undue reliance upon the expatriate professionals for establishing and running of libraries.

The existing libraries are not all doing well for these reasons alongwith a number of other basic problems which are mentioned below:

i) The absence of a central/national body or a national library/information board generally responsible for planning and co-ordinating the developmental activities in the field of librarianship and information sciences. Such a national body would assist the government to formulate a proper national library/information policy covering such important aspects as the education and training of library personnel, setting guidelines for policy regarding acquisition, technical processing, bibliographical control and availability of publications in different libraries of the country.

ii) There is a lack of qualified library personnel in libraries and this is responsible for the deplorable state of affairs in most of them. The authorities are contented with appointing clerks or book-keepers, rather than

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CITATIONS OF THE SOURCE JOURNALS IN THE FIELD OF LIBRARY SCIENCE AND THEIR RANKING

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A study has been carried out taking the citations appearing in the Annals of Library Science (afterwards Annals of Library Science and Documentation) during 1954-1975 (Vols. 1-22) as a base. Of the total 1545 citations appeared in the journal 217 relate to Indian journal articles & 350 relate to foreign journal articles Of the Indian periodicals Annals of Library Science (afterwards Annals of Library Science and Documentation) has been cited most accounting for 48.4% of the Indian journal citations. Of the foreign periodicals, American Documentation has been cited most accounting for 12% of the total foreign journal citations. The study also reveals that 77% of the Indian journal citations relate to only 5 journals, out of 24 and 68.3% of the foreign journal citation relate to 16 journals out of 85 journal cited.

0 INTRODUCTION

Like any other academic discipline there has been phenomenal increase in the research and scholarly output in the field of library science in recent years. Correspondingly there has been literature deluge in the field reporting the results of research and other scholarly pursuits. The change in attitude and outlook and awareness to the new responsibilities among the librarians and specialists in library and information science, provide them the opportunity and new incentive for research and innovation. Library schools and institutions study problems and contribute by reporting their interesting decisions. Their contributions are reported mostly through articles in journals, which are the primary media of communication. The quantum of journal growth in library science is like in any other developing sciences. Library science is also entering into a new horizon and it has attained the status of Information Science from Library Economy of Dewey in 1876. The literature growth makes a subject rich and it is necessary to know the reasons of the same. The reasons of literature growth might be the following:

1. Democratization of knowledge.
2. Large number of authors
3. Large number of academic institutions
4. Development of machine printing & machine made paper
5. Impetus of research which shifted from solo to team.

If we take into consideration the above facts, it is evident that daily new forms of literature of scientific value are coming out in different journals. The quantum of growth was reported by Prof. Bernal (4) that even if a scientist daily reads 8 hrs. the journals of his own field for the whole year, he will be able to cover only 10% of the total bulk. It has been further reported that the literature growth is six times more than the population growth. But all the articles and other documents published might not be of equal research value. At times some of the less useful documents are also cited. It results in false retrieval and wastage of time. In the field of research time is an important factor.

Citation analysis of articles can be used as an important tool to assess the value of scholarly literature. It can be said in general that, the more an article is cited the more authentic it is. The more a journal is cited the more the journal is popular and in circulation.

In India the citation analysis technique has been applied by Sengupta (1) in preparing the ranked lists of periodicals in different science disciplines and medical sciences. He has observed that equal weightage is not to be given to both old and newly published periodicals, while ranking the periodicals in terms of frequency of citation received by them. Newly published periodicals may receive lesser number of citations simply because they have been in existance for lesser number of years.

1. METHODOLOGY

All the citations mentioned at the end of the articles published in the Annals of Library Science and documentation from volume 1-22 (1954-75) were noted down on slips. All the information contained in the citations were noted in the same sequence as given by authors. These slips, then, were arranged volume-wise and analysis was made out of them keeping in different sequences for the different studies. The present study was made out of 1545 citations out of which 567 citations were to journal articles.

The identification of most important periodicals containing the research literature of library science is the major objective of this study. The slips were further divided into two categories, i.e., for Indian periodicals and foreign periodicals. Citations were first analysed to bring out the total number of citations received by each journal in each category.

The results were tabulated separately to show most cited journals in both the categories. Thus the ranking lists of periodicals were made along with their percentage, individually and over all percentage. Due to limitation of time citations received by a few newly published journals were not taken into consideration. After all, Brown /‾ 2 _7 advocated, that citation analysis is an assistance for formulation of acquisition policy, not a substitute for them.

Garfield and Sher /‾3 _7 had also said that taking the analysis one step forward, librarians and information scientists can organise collections of frequently used journals up to-date to provide pin pointed, up-to-date and exhaustive service.

2. OBSERVATIONS

From Table 1 and 2 a comparison can be made regarding the trend and reading habits of Indian library scientists. In these tables the ranked lists of Indian and foreign periodicals are given as per the frequency of the citations. Out of 1545 citations the total percentage of periodical literature were 567 i.e. 36.7%. These citations were separated into two broad groups and we found that 217 were from Indian and 350 from foreign periodicals. This means, that out of 36.7% periodical citations, 14.1% were from Indian and the remaining 22.6% from foreign periodicals.

2.1 Indian Coverage

These 14.1% Indian citations are distributed to 24 periodicals (Table 1). The "Annals of Lib. Sc. Doc." tops the list in terms of number of citations received. Out of these 24 journals the first 5 journals in the ranked list cover 77.0%, next 6 journals (6-11) cover 14.7% and last 13 (12-24) cover 8.3%. The data are shown below in Table 3.

2.2 Foreign Coverage

When we take into consideration the Table 2 we find that 350 citations were from foreign periodicals. Out of a total of 36.7% citations to periodicals 22.6% were from foreign periodicals. In the ranked list of foreign periodicals "American Documentation" tops the list. These 22.6% citations relate to 85 foreign periodicals. Out of these 85 journals, the first five (1-5) account for 38%. The next 11 (6-16) cover 30.3%, next 21 (17-37) cover 18.0% and the last (38-85) cover only 13.7%. The details are given in Table 4.

Tables 1 and 2 show that in the ranked lists there are some non-library science periodicals also. Curiously, in both the lists the 5th rank are occupied by non-library science periodicals i.e. in Table 1, "Indian J. of History of Medicine" and in Table 2, "Science".

It is obvious that the citations made in the Annals of Lib. Science and Doc. were more from foreign periodicals than Indian. This suggests that Indian library scientists have a tendency to refer and cite more foreign journals as maximum research works are carried out in the Western world.

The comparison of both the tables (1 & 2) also shows that the dispersion of library science literature is more in foreign periodicals than Indian. But overall citations from Annals of Lib. Sc. Doc. were maximum as the study is being carried out taking the same periodical as the source periodical and self citations must have increased the number of citations for this periodical.

3. POSSIBLE FACTS WHICH CHANGE THE RANKING OF PERIODICALS

1. Birth of new and death of old periodicals
2. Number of papers published in a periodical
3. Whether they are abstracted and indexed in the secondary periodicals

4. National and international research trends in the subject

5. Quality and scope of periodicals

6. Language of the periodical

IMPLICATIONS OF THE STUDY AND CONCLUSION

Total number of periodicals referred to in 567 citations were 109 (24 Indian & 85 foreign). The Indian citations were 217 out of 567 in 24 journals. Out of these 24 titles the first 11 had provided 91.7%. It implies that only 11 Indian periodicals can meet the majority of the requirements of library scientists.

Similarly 350 out of 567 citations relate to 85 foreign periodicals. Out of these 85 periodicals the first 37 journals contained 86.3% of total foreign coverage. It indicates that 37 foreign journals can meet the majority of the requirements of library scientists in India.

This means only 48 (11 Indian & 37 foreign) journals out of 110 can meet most of demands of the library scientists in India.

The finding, that there was a core of periodicals which will satisfy a high proportion of the demands of library scientists should be helpful to the librarians in establishing the optimum make up of the library science periodical collection and should provide a basis for cost benefit analysis in managing the subscription budget.

Such studies can serve as guidelines for the librarians to decide which publication should get a higher priority for acquisition.

Such studies can serve as guidelines to the documentalists and information scientists in deciding which publications need to be indexed in current awareness services and covered in SDI services.

Such studies will be of much value for the libraries in deciding which are the live periodicals and also which should be weeded out from the live collection.
It will also indicate that not all the journals require durable binding. Only the journals which are frequently used should be bound with durable and costly material.

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CITATIONS OF THE SOURCE JOURNALS IN LIBRARY SCIENCE

TABLE 1

RANKED LIST OF INDIAN PERIODICALS, THEIR PERCENTAGE COVERAGE & OVERALL PERCENTAGE

Sl. No.	Titles of Periodicals	No. of citations	% Coverage out of 217	Total % out of (567)	Overall coverage out of 1545
1.	Annals of Lib.Sci. Documentation	105	48.4	18.5	6.8
2.	Lib.Sci.Slant to Documentation	26	12.0	4.6	1.7
3.	Abgila	13	6.0	2.3	0.9
4.	DRTC Seminar	13	6.0	2.3	0.9
5.	Indian Journal Hist of Medicine	10	4.6	1.8	0.6
6.	IASLIC Bulletin	8	3.7	1.4	0.5
7.	Indian J. Med. Res.	7	3.2	1.2	0.4
8.	J. of Scientific Industr. Res.	6	2.7	1.0	0.4
9.	Science and Culture	5	2.3	0.9	0.3
10.	Bull. Calcutta School Trop. Med.	3	1.4	0.5	0.2
11.	Herald of Lib. Sci.	3	1.4	0.5	0.2
12.	Indian J. Agric. Economics	2			
13.	Indian Librarian	2			
14.	J. of Indian Med. Assn.	2			
15.	Nagarjun	2			
16.	Reserve Bank of India, Bull.	2			
17.	Annals I.L.A.	1	8.3	3.2	1.2
18.	ISIS (Indian Soc. for Inf. Sc.)Bull.	1			
19.	J. Asiatic Society	1			
20.	Library Bull. G.S.I.	1			
21.	Margin	1			
22.	Proceedings Nat.Acad. of Sci.	1			
23.	Proceedings Indian Sci. Congr.	1			
24.	CSIR News	1			
	TOTAL :	217	100%	38.3	14.0

TABLE 2

RANKED LIST OF FOREIGN PERIODICALS CITED IN ANN. LIB. SCI. DOC. (1954-75) V. 1 - 22

Sl. No.	Titles of Periodicals	No. of citations.	% Coverage out of 350	% Total coverage out of 572	% Overall Coverage out of 1545	Country
1.	American Documentation	42	12.0	7.4	2.7	US
2.	J. Documentation	27	7.7	4.8	1.8	UK
3.	Rev. Documentation	24	6.9	4.2	1.6	Belgium
4.	Unesco Bull. for Libraries	23	6.6	4.0	1.5	UN
5.	Science	17	4.9	3.0	1.1	US
6.	Lib. Resources & Tech. Serv.	15	4.3	2.6	1.0	US
7.	Aslib. Proc.	11	3.1	1.9	0.7	UK
8.	Chem.Engg.News	11	3.1	1.9	0.7	US
9.	Bull.Med.Lib.Assn.	10	2.9	1.8	0.6	US
10.	Lib.J.	10	2.9	1.8	0.6	"
11.	J. Chem. Documentation	9	2.6	1.6	0.6	"
12.	Library Assn. Record	9	2.6	1.6	0.6	UK
13.	College & Res. Libraries	8	2.3	1.4	0.5	US
14.	J. of Edn. for Librarianship	8	2.3	1.4	0.5	"
15.	Lib. Quarterly	8	2.3	1.4	0.5	"
16.	Special Libraries	7	2.0	1.2	0.5	"
17.	J. of Cat. & Classification	6	1.7	1.0	0.4	"
18.	International Library Rev.	5	1.4	0.9	0.3	"
19.	Bull.Physiological Society	4	1.1	0.7	0.3	"
20.	Library Trends	4	1.1	0.7	0.3	"
21.	Libri	4	1.1	0.7	0.3	UK
22.	Nature	4	1.1	0.7	0.3	"
23.	Scientific Inf. News	4	1.1	0.7	0.3	US
24.	Australian Lib. J.	3	0.9	0.5	0.2	Australia
25.	Bacteriological Rev.	3	0.9	0.5	0.2	US
26.	J. of Literature of Physics	3	0.9	0.5	0.2	"
27.	Qly. J. Acquisition	3	0.9	0.5	0.2	US
28.	American J. Physiology	2	0.6	0.3	0.1	"
29.	Amer. Librarian	2	0.6	0.3	0.1	"
30.	Biological Abstracts	2	0.6	0.3	0.1	"
31.	Dokumentation	2	0.6	0.3	0.1	Germany
32.	Federation Proceedings	2	0.6	0.3	0.1	US
33.	Industrial Engg. Chem.	2	0.6	0.3	0.1	"

2 An interview program aimed at surfacing current issues associated with STI;

3 Creation of an interpretative framework for analysing these issues;

4 Creation of an associated rationale for change;

5 Analyses of stakeholders pattern to identify factors which inhibit or facilitate change; and

6 Laying out the initial elements of a strategy for achieving the change required.

1. THREE BASIC MODES OF STI INFORMATION TRANSFER

Reviewing the currently existing information transfer patterns, the Report sets forth a framework describing three basic modes of STI information transfer, each corresponding to a different value system. The main theme of the Report is the integration of these separate patterns to achieve a common goal viz, problem-solving. The three modes are:

Disciplinary Information Transfer corresponding to the value system of pure science, academia and basic research - called Era I transfer.

Mission Information Transfer corresponding to the value system of big government - sponsored missions (like NASA, AEC in the 1960's) - called Era II transfer.

Problem-Oriented Information Transfer corresponding to the value system of solving societal problems - called Era III transfer.

The principal characteristics and features of the three Eras of information transfer are as follows:

1.1 ERA I Discipline-Oriented - Basic ethic - Knowledge for Knowledge.

These are meant, primarily, to support education, research and development. Information is generally disseminated through journals, books, seminars and meetings, usually associated with academic and research institutions, learned societies, professional bodies and the like. Access to the primary information is through indexing, abstracting and bibliographical publications. Institutions facilitating access to documents and use are largely the academic and technical libraries, though direct access is available. The user communities are the students at different levels, academicians, scholars, research scientists and others. Financial support to the system is through grants and subsidies and hence there is no question of charging a price for information services. This traditional system has been continuing for a long time, notwithstanding the strains and stresses now being suffered by the different components of the system*. The situations provide for direct feedback, in that the producer/user complexes control the quality, content, and objectives of the system.

1.2 ERA II Mission-oriented - Basic ethic - Organise to do a job.

The Era II Information systems developed during the 1950s through mid 1960s, have been created to provide support to mission oriented agencies like AEC, NASA and such others. Here the information transfer process is characterised by a need for coordinating and using simultaneously knowledge from a variety of disciplines such as the inputs of information on electronics, biology, medicine, aeronautics, chemistry, etc. required to carry out NASA missions. Information is disseminated through primary publications like technical reports, besides the journals and other traditional publications. Secondary services, providing access to the primary publications, are through varying degrees of interpretative and abstracting tools. The technical information centres that offer these services, being part of the mission agencies - mostly federal establishments - get their budget appropriations from the agencies. The user communities are the scientists, engineers and technologists and lately some business managers. The feedback mechanisms for controlling the system and using them to determine needs for information or research, are more or less, similar to those of ERA I, but the flow of information between the two systems has been unequal. While the mission oriented systems draw heavily on discipline-oriented information system, only limited reverse flow is provided through primary journals.

During this period Newsletters and Trade journals, increasing in importance, have been reflecting that some of the STI have relatively economic value and that less formal and more market-oriented information transfer mechanisms are required.

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* In an appendix, the Report discusses the present stresses and strains of public, academic and special libraries.

1.3 ERA III Problem-Oriented - Basic ethic - Solving Society's Problems.

Problem-oriented information systems have begun to emerge from the late sixties with growing emphasis in the seventies. These systems represent a context in which information is utilized for societal problem-solving, such as economic well-being, environmental protection, agricultural productivity, energy availability/use, public health/safety, disaster prevention/control. The type and structure of systems that can fully handle ERA III information, providing new products and services, have not yet been established, institutionalised or legitimized, but some characteristics and possibilities are beginning to emerge.

Information flow for the Era III has not yet clearly evolved. The users of the problem-oriented information systems are often ill-defined, but involve a variety of groups - elected officials and their staffs, civil servants, businessmen, attorneys, union officials, scientists, engineers, judges, market researchers, consultants, media people and local citizens. Apart from information required from a large number of disciplines - a major portion non-STI - some of the categories of information required are local, ill-organised, proprietory or value-oriented, involving critical value judgements. The feedback mechanism is practically non-existant.

Information brokers and intermediaries are the new type of institutions emerging to offer the specialised quality of service. Repackaged information, collected from a variety of sources with validated and authentic data, is the type of specific information service expected. Naturally this type of service will be available only at a price. Information brokers and Intermediaries draw heavily from Era I systems but at no cost or at best nominal cost.

New problem-oriented federal agencies have been established in the recent years such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Federal Energy Administration (FEA) which have long range objectives. There are also problems viewed as "one-shot" affairs of relatively short duration. Examples of this type of problems are "Crises and major social discontinuities - like "Spot" energy shortages, famines, major oil spills, consumer safety issues, newly identified pollution catastrophies, etc". The information system for handling this type of problems should be highly dynamic as the needs are difficult to specify in advance. /̅ See Tables 1 and 2 _/

2. MOVING FROM STI TO STSI

In its study and research of the current information situation and looking at the future with the fast changing environment, the authors of the Report claim considerable support to their suggested STSI from the various stakeholders, including the highest policy making body - the Congress. If the suggested conceptual framework of STSI is accepted, the issues and problems that need attention relate to a clear statement of objectives, an organisational infrastructure, the functions of the three different components, including their products and services, resolution of the stakesholders' conflicts, an action plan and its implementation. All these must be viewed in the light of the tremendous growth and development of science and technology, their impact on information as well as society and the consequent economics of information. A national information policy is imperative to draw all the forces to a central point and fix the directions to achieve the desired goal.

3. OBJECTIVES

The main objective is to integrate the three Era framework to serve the common goal of problem-solving. This would necessitate the introduction of a shift in the philosophies of Era I and II, coalesce them with the philosophy of Era III, without destroying the formers' original ethics, structure and functions. This would require broadening and redefining the earlier framework of STI to fit it into the Era III problem-solving frame and also ensure a smooth flow of information between the three eras.

4. ORGANISATIONAL INFRASTRUCTURE

The organisational structure for a new and more dynamic environment must be capable of dealing with several sets of problems. "First, the limited technical skills, and the often transient nature well as the very large numbers of Era III end users, suggest that the more traditional Era I and Era II direct information and influence feedback paths cannot be employed. Those concerned with Era III policy and decision-making are simply too far removed from those engaged in research and STI production. Instead, the feedback loop must work through a number of intermediaries. Second, the fact that information will normally be required from a multiplicity of agencies, requires the development of a greater degree of internal federal government coordination, standardization and commonality of thrust. This implies, among other matters, dissolving the solid boundaries existing between Era I and Era II STI structures in agencies and the newer Era III information programs. Third, the new information structure must be sensitive to the continuing changes in requirements." (p. 74). Figure 2 gives an idea of the desired structure showing the positions of Era I, II and III, the Intermediaries, the information flow between them and the major and minor influence flow. As the 'Intermediaries' develop, they will increasingly influence the nature and content of the information provided at Era I and Era II and eventually necessititate changes in the structure. Apart fron the internal linkages between the three Era framework which should permit smooth information flow and proper feedback, the external linkages will have to be the Congress and the Government Executive Agencies that would provide the necessary influence flow to reshape the existing structure.

5. FUNCTIONS

The additional functions of the institutions of Era I and II would be determined by the new responsibilities they may have to undertake to fulfill the demands of the new STSI. The information content of users of Era III is a wide mixture of scientific, technical, economic, political, demographic and other societal data; the mix will vary according to pressures to meet local and national needs and respond to changes in legislation, regulation, court decisions, etc. (Figure 1). The intermediaries that are envisaged to handle information in Era III would have to device means and methods to collect, organise and supply appropriate and relevant information in special packages. Of critical importance is the quality of information supplied to the highest decision makers who are deeply involved in problem-solving responsibilities. The information packages should ensure validity and authenticity of data, expert analysis and prompt delivery. Although some of these functions are presently performed by some intermediaries/information brokers, the Report emphasies the need to streamline and integrate the services with the overall framework suggested.

6. STAKEHOLDERS

The stakeholders, involved in the information transfer process, are grouped in four categories viz. 1 Producers (Academics, Research laboratories, Federal agencies), etc.); 2 Marketeers/Distributors (Publishing houses, Trade press, Data base publishers, Professional organisations, Libraries, Information brokers/Consultants); 3 Users/Buyers (Academia, Research organisations, Libraries, Planning organisations, Informtion brokers/Consultants, Citizens' groups etc.; 4 Policy makers, Regulators, Subsidizers (Congress, Executive Offices, Regulatory agencies/Courts, National Science Foundation, Learned societies, General public). On the basis of a 'Field Force Analysis'*, the Report formulates a model for STSI, indicating the influence flow among the components, influence flow between the legislative and executive forces and the operating constituents, and balancing the conflicting interests of the stakesholder groups. (Figure 2).

The process of change will have to take place through the interplay of two distinct dynamic forces. They are"

1. A market-oriented dynamic, involving private sector ventures of both for-profit firms and not for-profit organisations, like professional associations;
2. A central-planning dynamic, largely focussed around the federal role of STSI transfer.

The first dynamics is already operating and can be expected to assume importance as time proceeds, since the market-place provides an effective mechanism between information packager and user. The second dynamics is yet to be developed. The Report mainly concentrates on the federal action needed to initiate changes towards STSI.

The process of change will involve a series of steps which will have to be undertaken in several stages. These should be achievable in the foreseeable future, realistic so that the resources required could be marshalled, catalytic to stimulate different groups to act, and positive in that they start changes in directions that are congruent with the basic requirements outlined in the Report.

The series of steps to be taken at different stages to initiate action are summed up as follows:

1 Perception of the problem and potential solutions.

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* A Force Field Analysis is a diagnostic tool to aid seeing how a relatively static human situation can be converted into dynamic one through such steps as: Selected reduction of pressures, strengthening of certain pressures, application of new pressures, elimination of old pressures, and removal of barriers or constraints. The Pressures, here, means social forces and stakeholder influences. (p.73).

2 Stakeholders interaction policy formulation process.

3 Acceptance of a need for action derived from prior steps.

4 Passage of legislation.

5 Administrative implementation or reaction to existing legislation.

6 Management actions.

7 Supporting policy-related research requirements.

7. RECAPITULATION OF MAIN POINTS

A major social trend is under way in U.S. today, moving rapidly towards an information-intensive society. In this context, Information has to be viewed as a national resource, worthy of development, care and effective management (See Table 3). An effective information infrastructure is necessary to utilise the discoveries, innovations and techniques of modern science and technology in setting societal policies and in solving social problems as they arise. The existing STI infrastructure complex of scientific and technical journals, data banks, indexing and abstracting services, repositories and libraries, undoubtedly among the very best in the world, cannot alone provide for an adequate level of information availability and effective utilization. Therefore a problem-solving information system has to be developed which would augment STI with societal information to become STSI. This change can be brought about primarily by appropriate federal legislation and executive measures.

8. RELEVANCE OF THE REPORT TO THE INDIAN SITUATION

The three Era framework of STI is present in the Indian context though not with all their characteristics and features.

Era I institutions of libraries, documentation and information centres are operating at the academic and professional levels, R & D institutions and laboratories, government agencies and in many public and private undertakings. They are, however, functioning without any proper linkages.

Era II institutions sprung up in the country in the mid-fifties, sixties and seventies, to fulfill the exclusive information needs of mission - oriented organisations like the Atomic Energy Commission, the Indian Space Research Organisation. The Electronic Commission, the National Remote Sensing Agency and the like. CSIR, ICAR, ICMR and other research organisations, adopting multidisciplinary, multilaboratory and multi-organisational approach also fall in this group. Here again the information linkages have been rather weak both within Era II institutions and between them and Era I institutions.

Problem-solving institutions of Era III have been emerging slowly beginning from the seventies. The Small Enterprises Documentation Centre (SENDOC) of the Small Industries Extension Training Institute (SIET), the Documentation Wing of the National Health and Family Welfare Centre and a few others could be identified with this group. CSIR programmes in the fields of housing, school buildings, all-weather-rural roads, sanitation, pollution hazards, etc. can be examples of this approach. The Sectoral Information Centres for Drugs, Food, Leather, Machine tools may also fall under this group. Karimnagar and Chandrapur projects and the Polytechnology Centres located at different places in the country under CSIR, could also be classified in this group. The Environment Information System to be developed under the Department of Environment may be of this type. Some projects and programmes of ICAR, ICMR and such other research institutions and some of the departments of central ministries may come under Era III. All these, however, are yet to develop into Era III information institutions in the sense of their counterparts in U.S.

Of the "one-shot" varieties of relatively short duration, the Silent-Valley Project, the Mathura Oil Refinery, the Asiad 1982 and such others may be cited.

Institutions like Insdoc, SSDC Social Science Documentation Centre, more national in character, function and services, should also orient themselves with the problem solving information needs. They should also develop appropriate linkages between themselves.

The following observations may be made of these institutions in India, in comparison with their U.S. counterparts:

1 Most of these institutions, - perhaps all - have grown in the context of R & D activities and hence been oriented to service scientific and technical information, seldom to supply societal information. In this respect, they are more or less similar to U.S. institutions. This is largely due to,

as the Report asserts after a good deal of study and research, "R & D itself, perhaps, is planned or managed too rarely in the light of problem oriented priorities; therefore STI is often viewed as two steps removed from policy or problem centered decision activities. It(STI) is considered more as the product of R & D and the lubricants of further R & D than as the raw material for important decision and policy-making". "Decisions or policies made regarding societal issues are rarely made on the the basis of scientific and technical facts alone - legal, social, political and economic considerations are usually paramount and these too are domains of organised factual information. What is required is that STI be associated with other forms of society related objective information to provide a more complete information universe, including economics, demographic,political, occupational, health, legal, regulatory, sociological, cultural, environmental information." (P,5,6,7). If this is valid in the context of U.S., it is equally valid in the Indian context too. If social relevance is a major objective of all developmental activities, STI has to be dovetailed with societal information to make it STSI to develop goal-oriented information systems and services. This is certainly worthy of consideration.

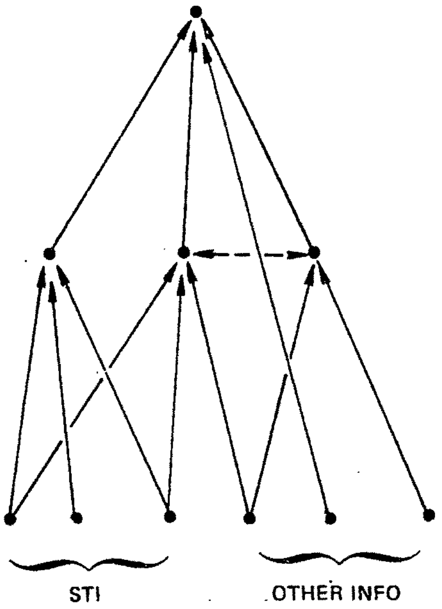
2 Information services in India have not yet reached any level of sophistication either in terms of utilising technologies to offer fast and versatile services or in the production of condensed/consolidated packages to meet the specific information needs at policy or decision making levels. All the institutions of the three era framework are offering only the traditional library and documentation services. Therefore there is hardly any distinctness in the type of services offered by these institutions, compared to their counterparts in U.S.

3 The stakeholders conflicts seen in the U.S. context, are totally absent in India, all the institutions being government sponsored and/or supported. But there are many other conflicts and bottlenecks that obstruct proper interaction between the various institutions. A Force Field Analysis appropriate to this situation is perhaps necessary.

4 A major problem faced in India in organising and managing information systems and services, is that scientific and technical information, almost in its entirety, has to be imported. Not only does this pose serious problems of collection building in terms of location, availability, high cost, timely acquisition etc., but this also subject us to the effects of changes taking place in the exporting countries which are always in their national interests, quite often disadvantageous to us. This is an inalterable situation in the foreseeable future.

9. CONCLUSION

A national information policy is very essential, if all the problems of information are to be given proper attention. This could stem only from the recognition and acceptance at the highest levels that information is a non-depleting resource for national development, worthy of care, development and management. A high power national commission comprising a cross section of experts from various fields including members of parliament should be set up to study all the problems of information and recommend a suitable course of action for developing a national Scientific, Technical, Societal Information System.



Hierarchy Members	Decision Nature	Requirements
President, Congress Governors, Legislatures, Board Chairmen, Regulatory Heads	Social Aspects of Use of Technology; Value Judgments; Social Trade-offs	Authenticity/Validation; Adequacy; Compatibility; Availability
Agency Heads, Mission Directors, Some R&D Directors	Resource Utilization and Planning; Data and Information Needs; Cost-Effectiveness Considerations	Authenticity/Validation; Exhaustiveness; Availability; Cost Relationships
R&D Directors, Laboratory and Group Heads, Individuals	R&D Planning; Detailed Program and Research Planning	Detailed Documentation; Reproducibility; Awareness of Research of Others and of Knowledge Gaps

FIGURE 1 HIERARCHICAL USES OF INFORMATION

TABLE 1
THE THREE INFORMATION CONTEXTS AND ERAS

	Time Scale of Recent Emphasis Era I	Basic Use of Knowledge	Corresponding Information System
Discipline-based	Traditional, from 19th Century and continuing	Study and development of scientific disciplines; strong growth of knowledge motivation	Discipline-based information systems; mainly research libraries and journal complexes
Mission-based	**Era II** WW II with height in the 1960's and continuing	Big science & technology; emphasis on Missions like: "Build an Atom Bomb"; "Put a Man on the Moon"; strong engineering and application emphasis	Mission-based information systems; large government-operated documentation systems, computer-assisted
Problem-based	**Era III** Some starts in the late 1960's; growing emphasis in 1970's	Emphasis on solving socio-technical systems problems; examples; providing better housing and transportation; improving quality of life in cities; equalizing job opportunities; preserving the environment; etc.; strong value judgment inputs.	Problem-based information systems (forms are still being determined)

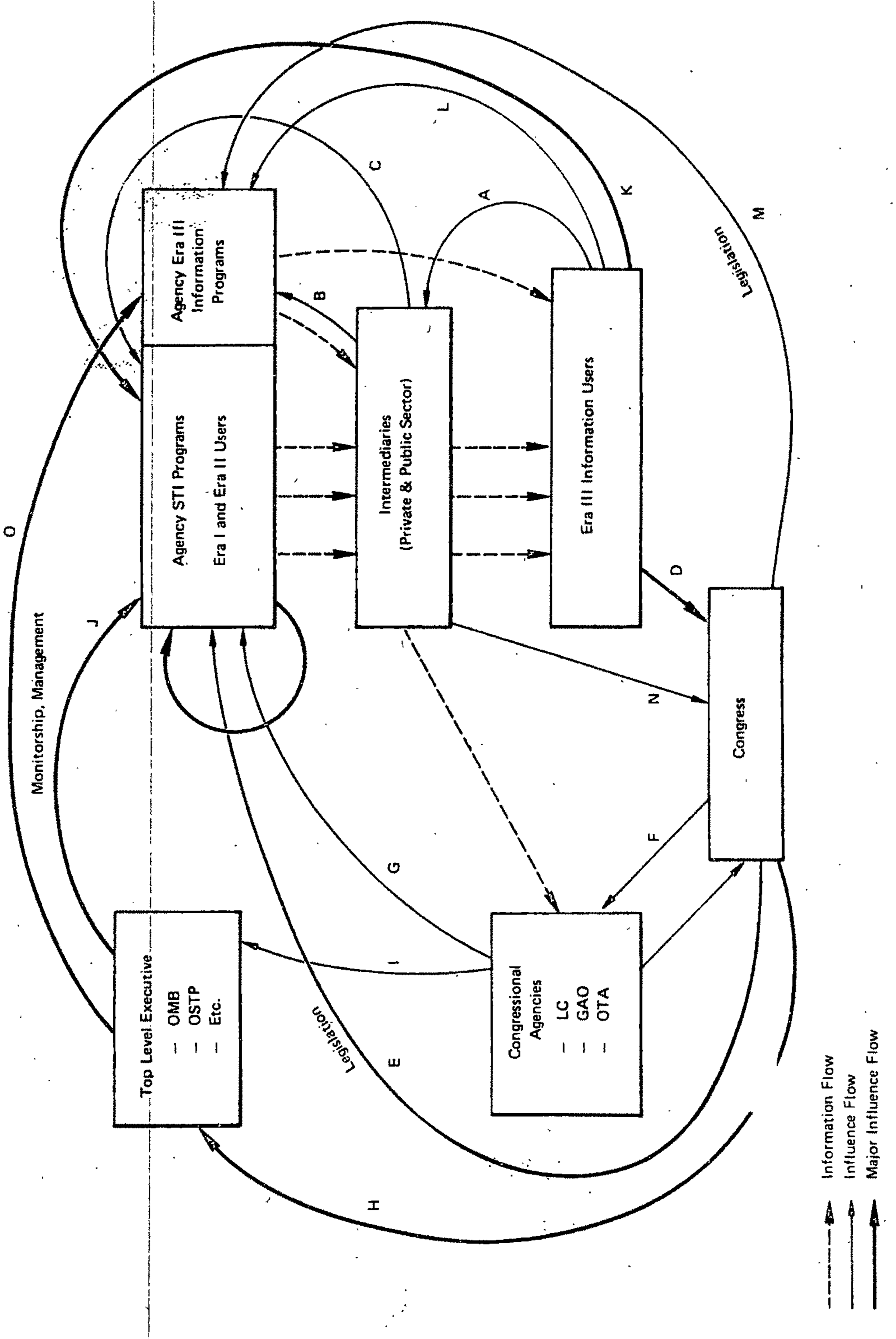


FIGURE 2 DESIRABLE FORCE FIELD SITUATION (DEVELOPING VIEW)

TABLE 2

CHARACTERISTICS OF THREE INFORMATION ERAS

"Wave" of Information System	Content of System	Target User Group/its size	User Sophistication	Typical Info. Institution/its Sponsor	Typical Information Vehicles/response time
discipline-oriented	truth of science, mostly dealing with physical systems	members of the discipline involved; from dozens to a few thousands; users generally individuals and heavily committed to disciplines	very high technical sophistication/communicate to members of a particular technical elite	research or technical library; technical journal/sponsored by members of a profession or by a university	print; books, journals/ publication time of months to years
mission-oriented	all of above; also truth of science as it applies to technological objectives, ways in which physical systems can be manipulated and controlled for practical purposes	technologists, engineers, applications people; usually a few thousand specialists — in a few special cases up to tens of thousands; users are part of team and committed for multi-year periods.	moderate to high technical sophistication/need to communicate across disciplines	special technical information centers; integrated document analysis, retrieval, processing systems/sponsored by agencies with major missions; NASA, DOD, AEC, NLM, etc.	printed reports, limited information repackaging; secondary vehicles employing computers/ response time of weeks, hours or minutes
problem-oriented	all of above; also wisdom and pragmatics which work in contexts of uncontrollable open systems that involve human as well as physical dynamics. Included must be legal, sociological, economic and demographic information and important social value inputs	large segments of the public in state and local governments; and all types of industries, communities, planners, conservationists, bureaucrats, newspapers, policy makers on all levels; hundreds of thousands up to millions; many users part of transient, relatively short-term conditions	range from very low to high technical sophistication/need to communicate across major cultural groups/heavy involvement of nontechnical professionals and political groups	all of the above plus online information supermarkets, commercial purveyors of repackaged government-originated information, data base publisher/consultants information intermediaries of various kinds play important roles in providing access, interpretation, evaluation; market mechanisms of rising importance.	(unsettled as yet) probably will make heavy use of telecommunications and interactive remote-terminal computer systems for part of needs, together with data base publications, newsletters and all traditional media. Will eventually be integrated with automated office systems.

TABLE 3

BASIC SOCIETAL RESOURCES AND THEIR CHARACTERISTICS

Type of Resource	Natural, Mineral and Materials Resources	Physical Man-Made Resources	Human Resources	Energy Resources	Information Resources
Examples	Minerals Natural Environment The Biosphere	Cities Transportation Systems Factories & Equipment Buildings	Human Skills Management Capabilities Effective Social Institutions, e.g., Families, Local Governments	Fossil Fuels Renewable Energy: Solar Geothermal Hydro Wind	Publishers, Libraries, Data Bases, Intermediaries, Information Networks
Characteristics	Limited — Require Care & Conservation & Research	Limited — Require Care, Conservation, Maintenance, Management & Research	Limited — Require Care, Development, Conservation, Management & Research	Limited — Require Care, Development, Conservation, Management & Research	Expandable — Require Development, Conservation, Management & Research
Utilization Cost Tendencies	Fixed and Rising Costs as Supply Decreases	Fixed and Rising Costs as Complexity Increases	Fixed and Rising Costs as Aspirations Increase	Fossil Fuels Have Rising Costs as Supply Decreases	Declining Costs as Information Technology Improves

Book Reviews

Information sources on bioconversion of agricultural wastes. New York, United Nations, 1979. (UNIDO guides to information sources, No 33). xii, 84p. $ 4.00 (UNIDO/LIB/SER.D/33). (Reviewed by B Guha).

The prevailing energy crisis and shortage of chemical fertilizers have added new significance to the possibilities of utilizing agricultural wastes to meet most of the needs in fuel and fertilizers within the agricultural sector, particularly in the developing countries. In this context, exchange of information on this important area of activities has become an essential pre-requisite for progress. The present guide is a useful tool towards this end.

As the title suggests, the guide is designed to lead the inquirer or the information worker to the sources of relevant information, both institutional and bibliographical. The sectional headings, that follow, will give an indication of the range of information sources that have been listed. They are: Professional, trade and research organizations, learned societies and special information services; Directories: Sources of statistics, marketing and other economic data; Basic handbooks, textbooks and manuals; Monograph series, Current periodicals, Current abstracting and indexing periodicals; Proceedings, papers and reports; Specialized dictionaries and encyclopaedias, Bibliographies; and other potential sources of information. Surely, the range is quite impressive.

As is well known biogas plants, or more specifically gobar gas plants have been used successfully in India and works are still going on. A number of institutions, publications, and names of active workers in India in the field find mention in different sections of the guide.

It is mentioned in the Preface that these "... guides are not intended to be exhaustive, nor are they intended to be research tools; rather, they present sources considered to be of practical value to users. The data have been compiled so as to facilitate rapid access to the bodies referred to and the acquisition of the publications listed." The present guide exactly lives up to this description. It would be equally useful to both information users and librarians.

Law librarianship, by Adrian Blunt. New York, K G Saur and Clive Bingley, 1980. 126p. (Outlines in modern librarianship). $ 4.50, ISBN 0-85157-299-5. [Reviewed by Renu Arora]

In keeping with the objectives of the Outlines of Librarianship series, the book is a brief overview of a relatively wide area. According to the author, this book is "intended as an introduction to the subject" for students and librarians - without any previous knowledge of law librarianship but faced with working in a law library and those working in other libraries but dealing with legal publications.

A law library comprises primary sources and secondary sources. Primary sources are made up of "books of law rather than books on law" like acts of parliament and reports of cases. By secondary sources is meant books about law - like treatises, commentaries, journals, etc.

Chapter 1 deals with the nature of law librarianship and the legal sources. The primary sources of law are covered in chapter 2 and chapter 3. The primary sources are legislation, law reports in serial form, legal journals, textbooks and cumulative supplements. The secondary sources of law are dealt with in chapter 4. Chapter 5 lists the bibliographies and reference tools of law. The next two chapters (chapter 6 and chapter 7) cover legal systems of British Isles, European Community and International law. The last two chapters deal with administration and organisation of a law library and the career of a law librarian. Although informative, this section is very short. Some detailed information on problems of running a law library and some illustrative examples would have been welcomed by readers.

Within a span of 126 pages (including a 3-page index) the author has managed to cover almost all aspects of law librarianship even though in a slightly condensed form. Under the heading Further Reading (P.121), it would have been appreciated if the author had given a reading list in proper form with full bibliographical details.

To sum up, in comparison to the already existing documents on the subject, this is a very small work but one cannot ignore the fact that the author has managed to survey the whole of law librarianship. In India, Library Science schools are now offering various specialisations relating to medical sciences, engineering and technology, agricultural sciences and many others. But they are yet to offer law librarianship as a specialisation. This book, thus, will surely be useful for students of such a specialised course. Meanwhile, librarians already in law libraries or intending to work in a law library or those having collection of legal documents can be benefitted by this book.

Picture librarianship, by Hilary Evans. London, Clive Bingley, 1980. 136p. (Outlines of modern librarianship, No.14) ISBN 0-85157-294-4 [Reviewed by T N Rajan]

Pictures are important vehicles of communication as they record human experience, feelings and imagination in a way far more expressive than words. Indeed special skills are required to handle a picture collection as visual documents each with its own uniquely revealing message. The book under review is an effort of an expert who has identified the salient features of picture librarianship and has offered useful guidelines for building a picture collection, organising and servicing them. This is one of the titles, coming under the series 'Outlines of modern librarianship' published by Clive Bingley; the series aims to provide overviews rather than in-depth studies on many of the areas of modern librarianship to be useful to students and practising librarians.

The book is organised in nine chapters that include the nature and function of the picture library, acquisition, care and maintenance, access and retrieval, classification and cataloguing, lending and copying, making a charge for services, copyright and administration. A list of six organisations offering valuable services specifically related to picture librarianship, is given at the end. All these organisations are located in London except one in Surrey. Eight items are listed under 'Further reading', out of which three are by Evans, the author of the book under review. The author is conscious of his over representation in the list, but indicates the paucity of literature in this field.

Picture libraries vary enormously and in every imaginable way. Collections in national libraries, national art galleries, public archives, learned societies, professional bodies, commercial and industrial firms, press agencies, photo agencies, historical reference archives, etc. have their own specific foci which are reflected in their organisation and services. A picture collection usually comprises original prints, engravings, photographs, colour transparencies made from originals of various kinds, postcards, cigarette cards, greetings, ephemera of all kinds, pictures contained in books, periodicals and other materials of this kind. Collection, processing, organising and servicing of all these types of material are indeed highly skilled jobs. The author gives full justice to every one of these aspects. Starting from the general principles and moving on to the discussion on the different factors that should govern the establishment of standard practices for the various functions of the library, the author displays considerable expertise that lends authority to the book. In the chapter on Classification and cataloguing, apart from storing and filing, a subject grouping is suggested for the organisation of the picture collection. This gives an idea of the range of subjects on which a picture collection could be built up.

The book is extremely well written with a racy style and makes interesting reading. This book must be on the working table of a library institution that has a picture collection.

The development of library collections of sound recordings, by Frank W. Hoffmann. New York, Marcel Dekker, 1979. viii, 169p. (Books in library and information science; a series of monographs and textbooks, ed. by Allen Kent, vol. 25). ISBN 0-8247-6858-2 [Reviewed by T N Rajan]

Musical recordings constitute an important segment of music literature. Not only do they provide entertainment to music lovers, but they also serve practitioners and students as invaluable aids to learning and teaching. They also are useful material for study and research. The book under review claims to be the first comprehensive textbook on the subject and the first book to cover the entire field of sound recordings, prerecorded tapes as well as disks, rock music as well as classical. The author gives useful guidelines to the selection and acquisition processes with annotated listing of periodicals helpful in the selection of material. The book also contains chapters on the care, preservation, arrangement and classification of sound recordings. A separate chapter on the audio reproduction equipment necessary in a music library adds value to the book. The kinds of equipment most frequently acquired in libraries having record collections are stereo phonographs with speakers, amplifiers and record changers, tape recorders with their accessories, radio broadcast equipment and headphones. Besides describing each one of these equipment in the context of their use in a library, the author gives a plan for the physical layout for the equipment to be placed in the library. In the appendix, a comparative rating of the performance quality of the equipment produced by different manufacturers, is also given. In a separate chapter, a suggested list of basic recordings with indications for acquisition for large and small public libraries, university and school libraries, media centres and institutions, is provided. A bibliography of books that aid selection of music recordings is presented with emphasis on books published between 1972 and 1977.

In the introductory chapter, the author rightly points out that while "book publishing and its technical aspects of production, aesthetic aspects of print, and the social and psychological implications of books and reading have all been integrated into the profession, in no single case can librarianship be said to have even begun to integrate similar knowledge or recorded sound into this profession". But conspicuously a book that purports to be very comprehensive on sound recordings, does not include a chapter dealing with these technical & social aspects of music recordings.

The book has limited use in the Indian context, as it is only on western music, primarily meant to suit the conditions in US.

Handbook of information scientists and librarians in India, compiled by Neelima Kaul. New Delhi, Citation Publishers, 1980. vi, 186p. Rs. 95 (£10, $ 30).

A major part of this Handbook, 133 pages to be exact, covers a who's who of librarians and information scientists, including teachers of library and information science. As the items in this part are numbered, one can easily find out that there are just 1220 items, which in other words mean that the bio-data of 1220 persons in the library and information field have been included in the who's who. The remaining pages are devoted to the listings of library science courses conducted by the universities in different states; Library and information science associations, Library and information science journals; Dealers in reprographics; Select list of booksellers and publishers; Name index; and Institution index.

So far as the who's who portion is concerned, one may argue that it is not very exhaustive. In a compilation of this nature where the coverage ultimately depends on the location of individuals in different organisations and their individual response, there are likely to be some omissions. However, going through the pages and making a few random checks, the present reviewer did not find any serious omissions.

Equally important as the collection of information is the work of repackaging the collected information onto standard format. Even if a pre-designed questionnaire or response sheet is used, human nature being what it is, there are usually wide variations in the response from individuals. The compiler has done a good job of putting the material in a standard format. The names of those persons who have not responded, in spite of reminders, have also been included. They, of course, get name and address entries only.

The inclusion of the lists, which have been enumerated in the beginning of this review, has greatly enhanced the value of the Handbook. Some of the lists, such as, library and information science journals, booksellers and publishers, or dealers in reprographics, have necessarily to be selective and they are so. In the list for library science courses, there are a few omissions. Sambalpur and Udaipur universities are not mentioned. Courses of some of the universities are not fully mentioned, for example, M.Lib.Sc. course of the SNDT University and M.A. course of the Calcutta University find no mention in the list. This list and the list of library and information science associations suffer from another deficiency. The address of each university or association with the name of the head or the secretary, in the case of an association, would have greatly enhanced the value of both the lists. The second list also misses a couple of items, for example, IATLIS has no place in it although the bio-data of a number of persons show they are member of IATLIS.

These are small blemishes when considered in the context of the amount of information the Handbook provides. The Handbook will surely be a useful addition to the reference collection of libraries.

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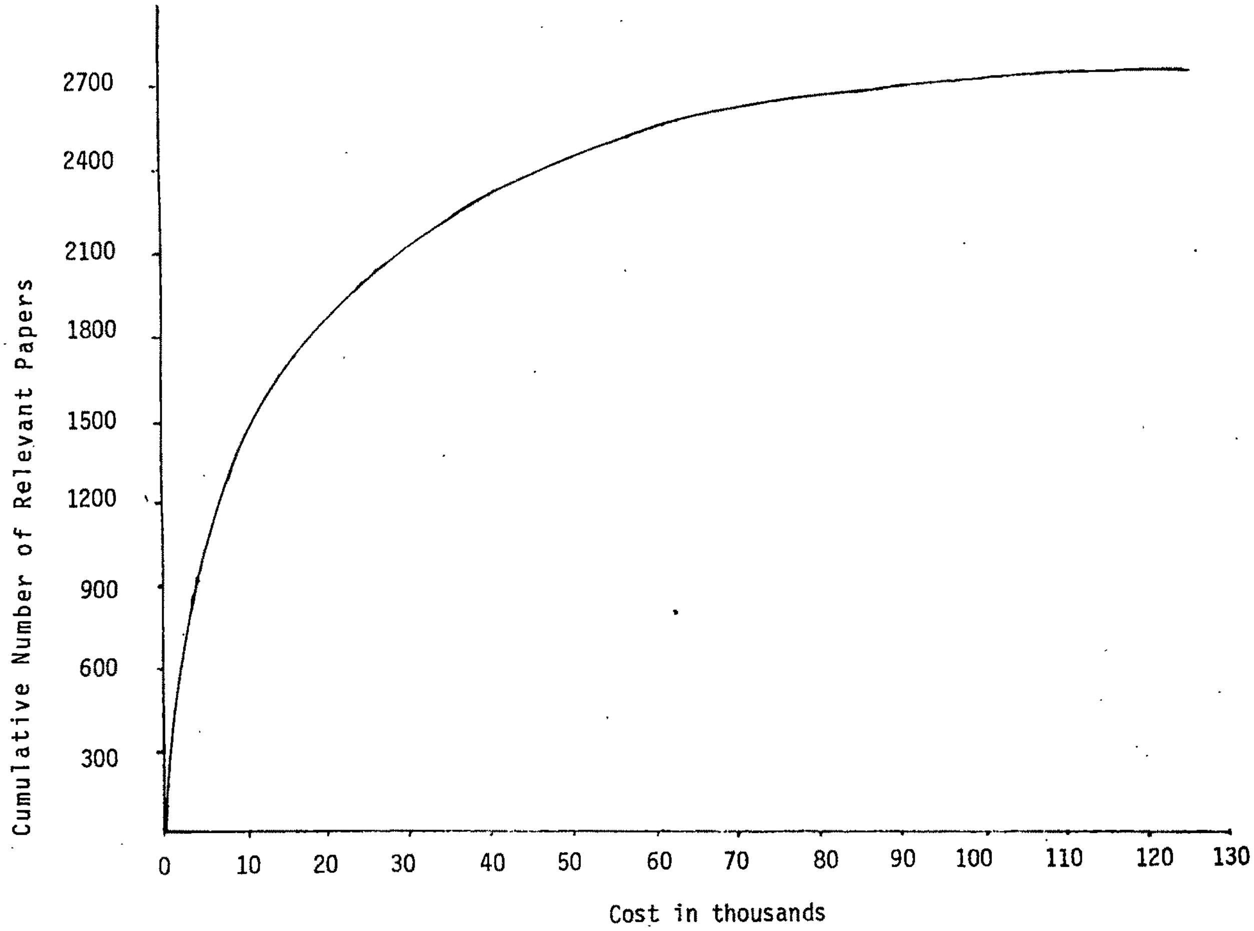

Cumulative Cost in Thousand Rupees

An article entitled "Journal acquisition and cost-effectiveness in a special library, a case study" by K S Raghavan was published earlier. (Ann Lib Sci Doc 1978, 25, 98-100). This article was jointly written by K S Raghavan and Ms R Shalini (Dept. of Lib Sci, Univ of Mysore). The joint author's name was ommitted through an oversight. Further, the article had one graph which also was missed but is now reproduced. The error is regretted. - Ed.

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